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Measuring the effects of the radio drama *Impano n'Impamba*: fertility awareness and family planning results

Institute for Reproductive Health, Georgetown University

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FACT
Fertility Awareness for Community Transformation

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Acronyms

DHS	Demographic and Healthy Survey
EC	Emergency Contraception
FACT	Fertility Awareness of Community Transformation
HTSP	Healthy Timing and Spacing of Pregnancy
IRH	Institute for Reproductive Health
IUD	Intra-uterine Device
LAM	Lactational Amenorrhea Method
PMC	Population Media Center
SDM	Standard Days Method
USAID	United States Agency for International Development

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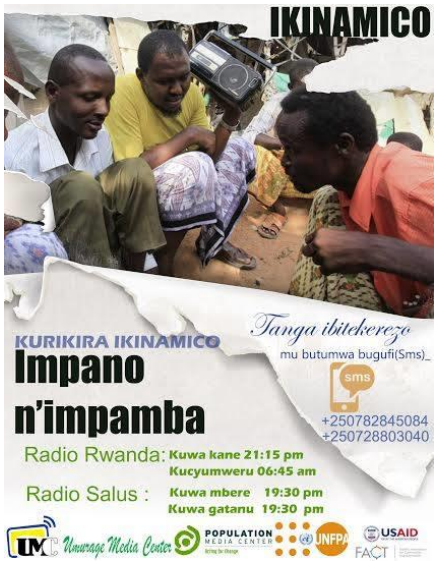
Executive Summary

IMPANO N'IMPAMBA was broadcast nationally in Rwanda from October 2014 to October 2015. The Population Media Center developed the radio drama, and the Institute for Reproductive Health integrated fertility awareness information into the storylines with messages about the menstrual cycle, family planning, couple communication, and healthy timing and spacing of pregnancy.



Evaluation

A community-level household survey was conducted with a nationally representative sample of 1477 women and men of reproductive age to assess differences in knowledge, attitudes, and behaviors between listeners and non-listeners of the Impano n'Impamba radio drama.

Key Results

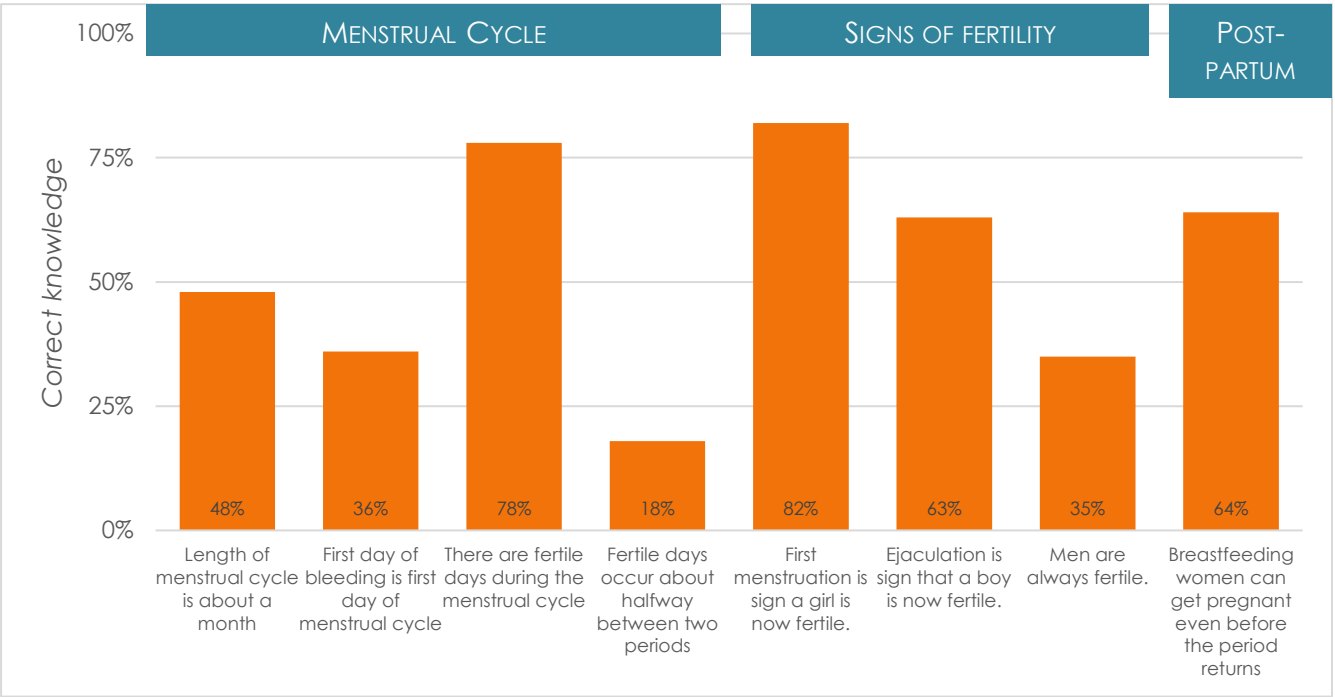
Listenership

- 18% of study participants (n=267), were classified as Impano n'Impamba listeners according to the Demographic and Health Surveys definition of listening to the radio drama at least once a week.
- Listeners were further classified as **"standard listeners"** if they listened at least once a week but were unable to name any characters (13%), and **"engaged listeners"** if they could spontaneously name at least one character (5%).

Fertility Awareness

- Considering all study participants, both listeners and non-listeners, overall fertility awareness was high for knowing that:
  - first menstruation is a sign that a girl is now fertile (82%), and
  - there are fertile days during the menstrual cycle (78%).
- Fertility awareness was lowest for knowing:
  - the first day of bleeding is the first day of the menstrual cycle (36%),
  - men are always fertile (35%), and
  - fertile days occur about halfway between two periods (18%).
- Study participants with correct fertility awareness were more likely to be: women, older, more educated, married, and have children.

Correct fertility awareness knowledge by topic and question among household survey participants



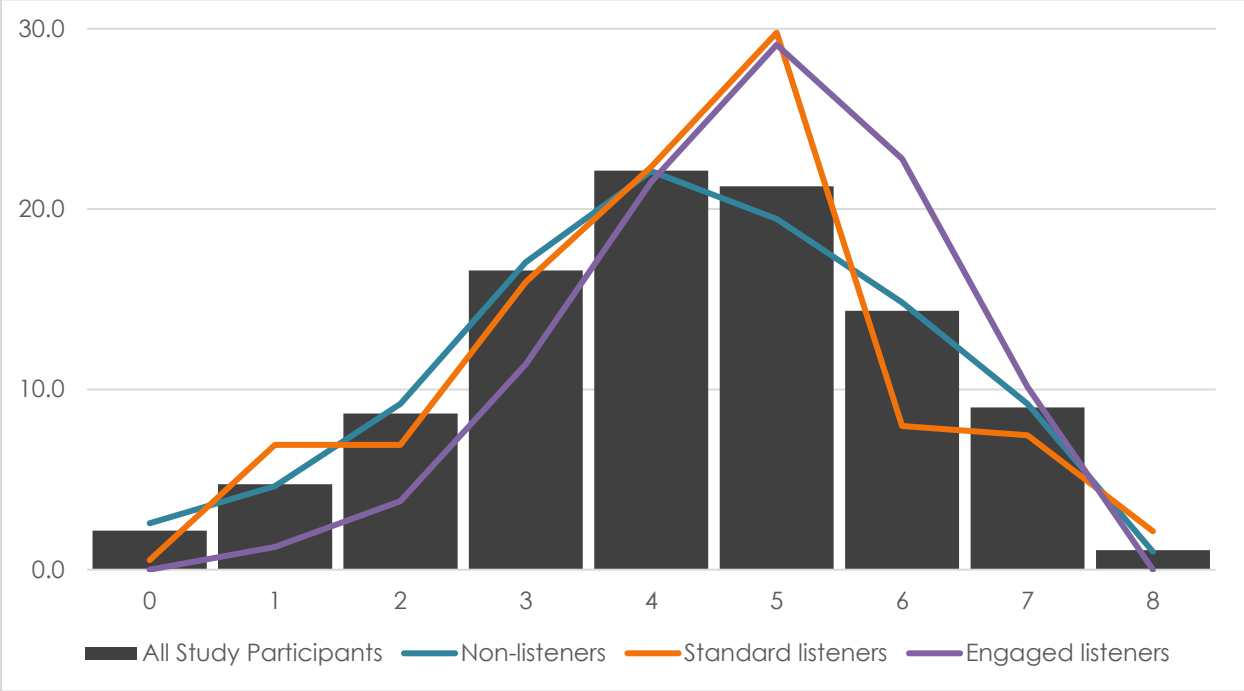
Differences between listeners and non-listeners

- There were significant differences between listeners and non-listeners for several indicators related to fertility awareness when controlling for demographic variables.
    - **First day of the menstrual cycle**: OR 1.7 (1.0 – 2.7)* for engaged listeners compared to non-listeners and standard listeners
    - **There are fertile days during the menstrual cycle**: OR 1.6 (1.0 – 2.4)* for standard listeners compared to non-listeners
    - **Menstruation is a sign of fertility in girls**: OR 1.7 (1.1 – 2.6)* for standard listeners and 3.2 (1.3 – 7.7)* for engaged listeners compared to non-listeners
    - **Ejaculation is a sign of fertility in boys**: OR 2.5 (1.4 – 4.5)** for engaged listeners compared to non-listeners and standard listeners.
    - **Women can get pregnant while breastfeeding**: OR 1.7 (1.0 – 2.9)* for engaged listeners compared to non-listeners and standard listeners.
- Listeners (both standard and engaged) were significantly more likely to have discussed family planning with family, friends, or neighbors in the past 3 months: OR 1.6 (1.2 - 2.1)** compared to non-listeners.
- Differences in attitudes and knowledge about family planning were significant between listeners and non-listeners (with no differences between engaged and standard listeners).
    - **Married couples use family planning**: OR 1.4 (1.0 – 2.0)* for listeners
    - **Unmarried men use family planning**: OR 1.3 (1.0 – 1.8)* for listeners
    - **Unmarried women use family planning**: OR 1.4 (1.0 – 1.8)* for listeners
    - **I know where to go to access family planning**: OR 2.2 (1.1 – 4.4)* for listeners

- The distribution of fertility awareness scores (0 – 12) follows a bell curve with all study participants, non-listeners, and standard listeners. The scores for engaged listeners are skewed to the right.

* p<.05, ** p <.01, *** p <.001

Distribution of fertility awareness scores by listener classification



- Engaged listeners had a significantly higher mean fertility awareness score (4.8)compared to non-listeners and standard listeners (4.2).

Family Planning Use

- 42% of study participants were currently using a method of family planning. 33% were not currently using a family planning method but planned to in the future.
- Men, participants between the ages of 25 and 34, and participants with children had significantly higher odds of being current family planning users. Men and participants under the age of 35 had higher odds of intentions to use family planning in the future.
- There were no differences in either current or intended future use of family planning between listeners and non-listeners.

Relationship between Fertility Awareness and Family Planning Use

- Fertility awareness score and Impano n'Impamba listenership were not associated with current family planning use or intentions to use family planning in the future.

- Fertility awareness was associated with current family planning use for two indicators.
    - Study participants who knew that there are **fertile days during the menstrual cycle** had 1.4 higher odds of currently using family planning then participants with incorrect knowledge (95% CI 1.0 – 1.9, p<.05).
    - Study participants who knew that **to use LAM the baby must be exclusively breastfed** had 1.5 higher odds of currently using family planning (95% CI 1.1 – 1.9, p<.05).

Conclusions

Impano n'Impamba increased fertility awareness knowledge, and positive attitudes and communication about family planning. However, it was not sufficient to increase family planning use. Listener groups and other transmedia elements may need to be combined with narrative based storytelling to change behaviors related to sexual and reproductive health.

Introduction

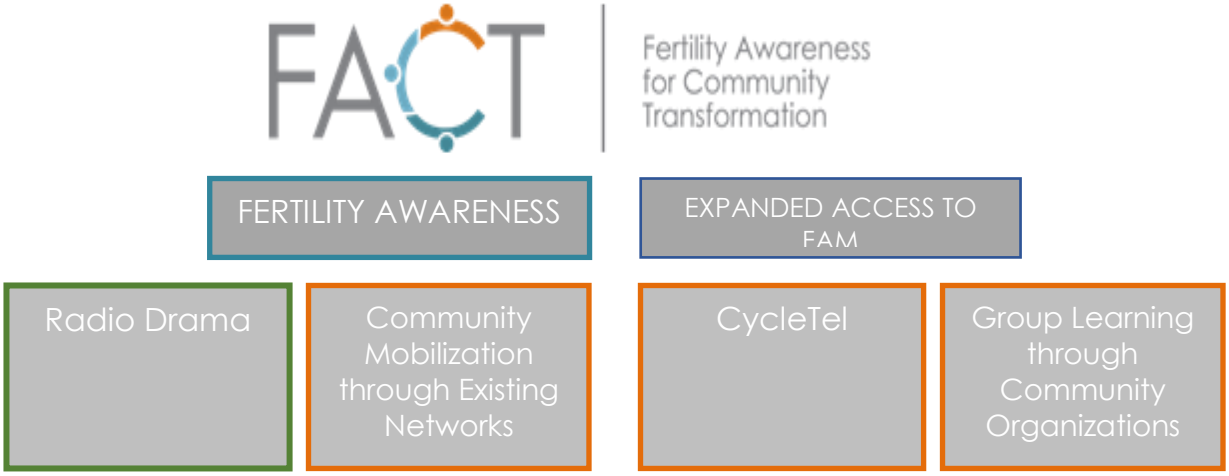
The FACT Project

Georgetown's Institute for Reproductive Health (IRH) received funding from the United States Agency for International Development (USAID) to implement the project, "Fertility Awareness for Community Transformation (FACT) Project" (Cooperative Agreement No. OAA-A-13-00083). FACT is a five-year project implemented in partnership with the International Center for Research on Women (ICRW), Population Media Center (PMC), and Save the Children (SC).

FACT aims to foster an environment where women and men can take actions to protect their reproductive health throughout the life-course. As a research, intervention, and technical assistance project, FACT is testing solutions for increasing fertility awareness and expanding access to Fertility Awareness Methods (FAM) at the community level, with the goal of reducing unintended pregnancies and improving family planning use. As a research, intervention, and technical assistance project, FACT is testing two primary hypotheses: Increased fertility awareness improves family planning use, and expanding access to FAM increases uptake of family planning and reduces unintended pregnancies. IRH and its partners employ a systematic approach to testing these hypotheses through developing and assessing innovative solutions to improve fertility awareness and expand availability of FAM.

The FACT Project was designed to include four proposed solutions covering two domains. The first domain is improved fertility awareness and includes two solutions: 1) a serial radio drama and 2) community mobilization through existing networks. The second domain is expanded access to FAM, which includes two solutions: 3) CycleTel and 4) group learning through community organizations. This report will present findings from a quantitative assessment of the impact of the serial radio drama in Rwanda as it relates to fertility awareness and family planning through a survey of listeners and non-listeners.

Figure 1: FACT domains & solutions



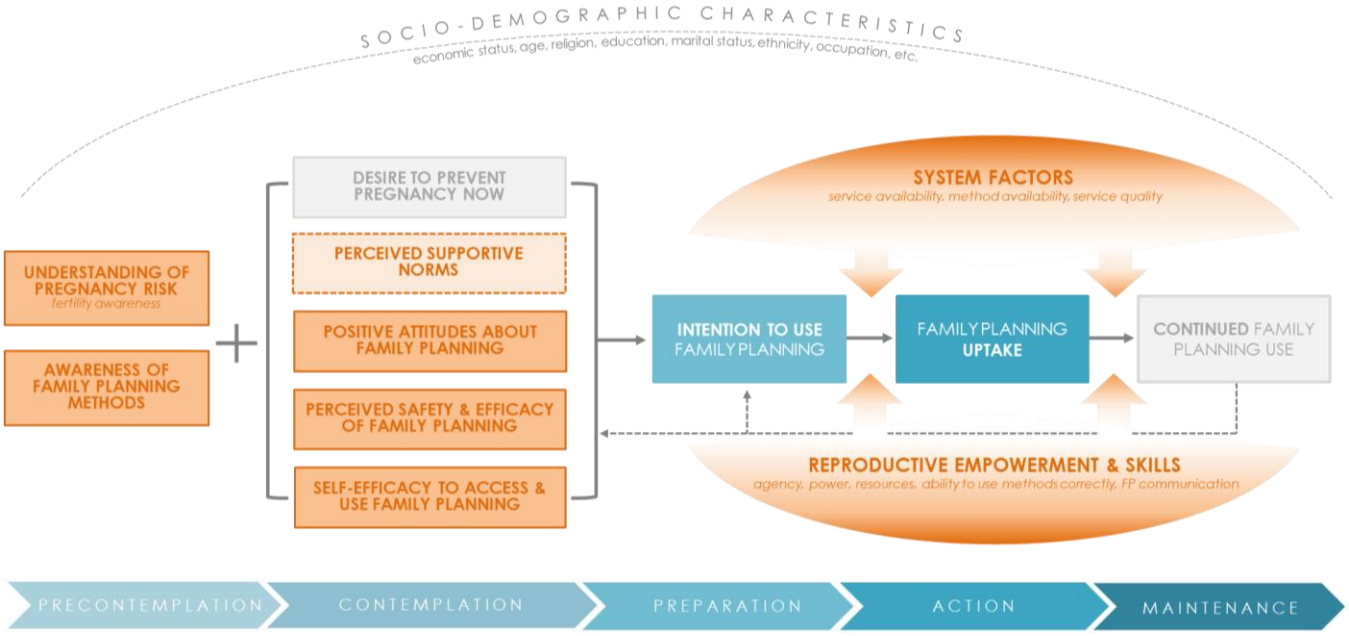
Family Planning Social and Behavior Change

In seeking a behavior change model that would describe the pathway to family planning use, IRH reviewed a number of well-established behavior change theories, of which none captured the factors influencing family planning entirely. Instead, the FACT team proposed a new model that blends elements of these existing and accepted theories (Figure 2). This blended behavior change model is based on 1) the transtheoretical model (previously ASE model), 2) the I-change model, and 3) the extended parallel process model. The trans-theoretical model suggest that several psychological steps must occur before an action is taken: including pre-contemplation, contemplation, and preparation. During this time, a variety of factors in the external environment are at work to influence a person's intentions. These factors are seen in the boxes on the left hand side. With these factors in place, the individual develops an intention to use FP. Like the I-change model, this model assumes that intentions predict behavior. However, reproductive health research has found that intentions do not always translate into action without several facilitating factors being in place. These factors are described in the circle on the right hand side.

Within the context of family planning, the factors influencing behavior change include:

- **Understanding of pregnancy risk**: Describes an individual's understanding of the likelihood of becoming pregnant across the life course and at different times during the menstrual cycle.
- **Awareness of family planning methods:** Includes knowledge of the existence of methods available to prevent pregnancy
- **Desire to prevent pregnancy now**: Describes the motivation of the individual to delay or limit pregnancy. (While we recognize its influence in FP uptake, FACT does not aim to influence this desire.)
- **Perceived supportive norms**: Includes supportive social norms for family planning, e.g. belief that neighbors use FP, approve of FP use, and expect others to use FP. This can also include indirect norms around gender, e.g. expectations for women's/girls' behavior during menstruation.
- **Positive attitudes about family planning**: Includes individual attitudes of approval for FP use and the belief that FP facilitates physical, relational, and financial health, etc.
- **Perceived safety and efficacy of family planning**: Includes accurate knowledge of FP methods and perceived safety, e.g. addressing concerns around side effects and myths
- **Self-efficacy to access and use family planning**: Includes belief in one's own ability to influence or control when they get pregnant and overcome any barriers to accessing services.
- **System Factors:** Includes service availability and quality, human resources, availability of commodities and the range of methods available
- **Reproductive Empowerment & Skills:** Interpersonal dynamics related to empowerment like agency, power, resources, and the skills to access services and communication with one's partner
- By understanding the steps necessary to achieve correct and continued use of family planning, the FACT team can tailor interventions to the stage of the individual and begin to understand why some interventions may work – or not – for a certain audience.

Figure 2. Blended Theoretical Model for Family Planning Social and Behavior Change



Fertility Awareness

The FACT project and respective solutions aim to increase fertility awareness and expand FAM to reduce unintended pregnancies and improve reproductive health outcomes. IRH conducted a systematic review of the literature on barriers to family planning use that could be mitigated by fertility awareness and found that, in addition to concerns about side effects, there are other more nuanced reasons for unmet need for family planning. For example, inaccurate assessment of pregnancy risk reduces family planning use at critical points in the life cycle (Kauyate, 2010; Kaye, 2009; Makinwa-Adebusoye, 1992). In some settings, family planning use is stigmatized or people believe it is not within human power to control fertility (Sedgh, Hussain, Bankole, & Singh, 2007). Many believe pregnancy requires frequent sex, or that having had sex without becoming pregnant indicates they may be infertile. Other researchers have found that negative perceptions of family planning, including lack of self-efficacy to control fertility, results in failure to discuss and seek family planning services (Kauyate, 2010; Kaye, 2009; Makinwa-Adebusoye, 1992). Gender dynamics and partner communication also play an important role in family planning use or non-use (Varga, 2003).

FERTILITY AWARENESS
actionable information about female and male fertility throughout the life course, and an understanding of how this knowledge applies to one's own circumstances and needs
(specifically: basic information about the menstrual cycle, how pregnancy occurs, the likelihood of pregnancy from unprotected intercourse at different times during the cycle and at different life stages; how family planning methods work with the body to prevent pregnancy)

Fertility awareness involves both actionable information about fertility throughout the life course and the ability to apply this knowledge to one's own circumstances and needs. The ability to apply this information to one's life requires individual knowledge, personal experience and skills, as well as an environment within the family and community that enables people to undertake appropriate

actions. FAM are natural methods that are information based, and may meet the needs of couples who experience or are concerned about side effects, couples who have infrequent intercourse, and those in settings where disapproval (or perceived disapproval) of family planning is common. Research by IRH and others has shown that FAM are effective (Arévalo, Jennings, Nikula, & Sinai, 2004; Arevalo, Jennings, & Sinai, 2002; Labbok et al., 1997), low cost (Rosen, 2013), and can be offered by community providers and through social marketing (Johri, Panwar, & Lundgren, 2005; Kavle, Eber, & Lundgren, 2012). Given these findings, it seems that increasing fertility awareness could prove beneficial to addressing issues related to family planning in Rwanda.

Family Planning & Fertility Awareness in Rwanda

Rwanda is a densely populated country in Central Africa with over 12 million people, most of whom live in rural areas. According to preliminary findings from the 2014-15 Rwanda Demographic and Health Survey (RDHS), 48% of married women in Rwanda reported currently using a modern method of family planning. However, unmet need remains considerable at nearly 19% of women. The most frequently used modern methods for all women were injectables (14%), oral contraceptives (5%), and implants (5%). Of women who visited a health clinic or community health worker in the last 12 months, 75.2% did not discuss family planning (NISR, 2015).

In spite of strong government support and a robust health system providing family planning services, gaps still remain. The primary reason women state for non-use of family planning is that they are breastfeeding or amenorrheic (FHI 360, 2012). While breastfeeding rates are high in Rwanda, 30% of women are susceptible to pregnancy within just 4-5 months after childbirth, given breastfeeding patterns common in Rwanda. Guidelines for healthy timing and spacing state that a woman should wait at least two years after a birth before becoming pregnant again; yet over half of all births in Rwanda occur at or below this minimum standard. Furthermore, only 19.6% of women in Rwanda can correctly identify the time during their menstrual cycle when they are fertile ((NISR), 2015). This data indicates low fertility awareness among Rwandan men and women.

Similar levels of fertility awareness have been shown for adolescents in Rwanda. Formative research conducted by IRH demonstrates low knowledge regarding fertility and reproductive processes among very young adolescent boys and girls, discomfort with puberty-related changes among boys and girls, and the critical influence of gender norms in shaping perceptions and experiences of puberty (IRH, 2011). While puberty and fertility-related topics are taught in schools to some extent, many Rwandan adolescents report not receiving the information until after puberty changes have begun, and state that their peers are their primary source of (often incomplete or inaccurate) knowledge on these topics. Dialogue around fertility and body literacy educates adolescents about the changes that will occur in their bodies and could serve as a starting point for discussions between adolescents, their families and their communities on fertility, safe sex practices, and sexual and reproductive rights.

While solutions that improve fertility awareness cannot tackle all of Rwanda's family planning challenges, they could potentially contribute to:

1. Improved knowledge of the menstrual cycle and fertile period
2. Understanding of risk taking

3. Insights on how methods work
4. Support for better and continued use of methods
5. Increased understanding of the conditions for using the Lactational Amenorrhea Method (LAM) to prevent pregnancy during the post-partum period
6. Better couple communication/increased empowerment for women

Radio Serial Drama

Population Media Center (PMC) led the development, production, and broadcast of a radio serial drama in Rwanda using a proven theory-based approach to behavior change communications developed by Miguel Sabido. Role modeling is a central tenet of this methodology. Listeners become involved in the stories, care what happens to the characters, and remember information better when the context is familiar and there's an emotional connection. The radio drama includes multiple interweaving plots making it possible to address more than one issue over time in an engaging way. Characters mirror real-life situations and can evolve in their thinking and behavior at a believable pace -- an advantage to other forms of media messaging such as billboards or PSAs.

Impano n'Impamba (A Gift for Today That Will Last a Long Time) was a year-long (October 2014 – October 2015), 104-episode radio drama, which addressed a variety of health and social issues. It centered around four major storylines: family planning/healthy timing and spacing of pregnancies, HIV/AIDS prevention and reproductive health for youth, gender-based violence prevention, and maternal and child health. The FACT Project worked with PMC to integrate fertility awareness information into the four storylines to test the hypothesis that improved fertility awareness via the radio serial drama will increase family planning use.

Study Purpose and Objectives

The purpose of this study was to measure the impact of the radio drama Impano n'Impamba on the knowledge, attitudes and behaviors of their listeners in Rwanda across several outcomes. Listenership among the populations in the target communities was established, and then outcomes were compared between listeners and non-listeners. Findings from this study can be used to develop recommendations for future narrative-based mass-media health campaigns within or outside of Rwanda.

The objective of this study was to assess differences in knowledge, attitudes, and behaviors between listeners of the Impano n'Impamba radio drama and non-listeners on the following topics:

1. Fertility awareness knowledge and pregnancy risk
2. Knowledge, attitudes, and behaviors relating to family planning and family planning
3. Communication with peers and partners about fertility and family planning

Methods

Research Design

This study was a quantitative cross-sectional descriptive study consisting of a nationally representative community-level household survey conducted after the end of the broadcast of Impano n'Impamba. The target sample was 1500 women and men of reproductive age (women 15 – 49 years of age, and men 15 – 59 years of age) from 50 villages in Rwanda, approximately 30 individuals per village.

A multistage random sampling method was used. First, 50 sectors in Rwanda were randomly selected. Then, within each sector, a simple random sampling method was used to identify an umudugudu (smaller administrative units or villages) as a cluster within a cluster. A systematic sampling method was used to identify the households to include in our study. Within the umudugudu, 20 households were visited, with a goal to sample 30 individuals. Every eligible household member in selected households present on the day of data collection were interviewed.

Instruments

The study implemented three surveys: a male survey, a female survey, and a household survey. Survey instruments included many questions from the Demographic Health Survey (DHS), and were available in Kinyarwanda, French and English. The household questionnaire was answered by the head of the household, but contained questions about household characteristics (e.g., wealth status) that were valid for all family members. The individual male and female questionnaires were identical, but corrected for gender (e.g., Do you breastfeed? vs. Does your partner breastfeed?). Each survey captured data across a range of topics. The list of topics and indicators for each survey are described in detail below.

Table 1: Topics and indicators from the Impano n'Impamba surveys

Topic	Indicator
HOUSEHOLD QUESTIONNAIRE	
Composition and characteristics of the household	• Location of household (rural/urban) • Composition of the family • Characteristics of the household living conditions
MALE AND FEMALE QUESTIONNAIRES	
Individual characteristics	• Age • Religion • Level of education
Fertility awareness	• Knowledge on male and female fertility • Knowledge on menstrual cycle • Knowledge on fertile days and pregnancy risk • Knowledge on post-partum fertility and breastfeeding • Attitudes towards communication around menstruation and the menstrual cycle
Marriage and children	• Matrimonial situation • Number of children • Desired number of children
Pregnancy	• Current pregnancy • Past pregnancy • Desire of pregnancy • Spacing of pregnancy
Family Planning	• Knowledge on family planning methods • Past use of family planning methods • Present use of family planning methods • Future intended use of family planning methods • Knowledge on where to get family planning materials
Pregnancy and Family Planning	• Ideal age for marriage • Ideal age to have children • Ideal birth spacing • Desired number of children • Desirability of using family planning
Impano n'Impamba	• Knowledge on existence of Impano n'Impamba • Frequency of listenership to Impano n'Impamba • Knowledge on principal characters of Impano n'Impamba • Quality of Impano n'Impamba • Relevance of Impano n'Impamba for daily life

Analysis

Descriptive analysis was conducted for all outcomes and data tables developed. Chi-square tests were performed to compare outcomes by key demographic characteristics. The demographics used were: sex, age, marital status, education, type of residence, province, wealth, children, and religion.

Impano n'Impamba listenership was defined as listening to at least one episode per week, or being able to spontaneously name at least one character from the radio drama. The radio drama was broadcast twice a week on two radio stations—Radio Rwanda and Radio Salus, so listeners could hear the program anywhere from 1 – 5 times in a given week.

To ascertain the effects of listenership on key outcomes, while controlling for demographic variables, binary logistic regression analyses were performed. Each model included listenership, sex, age, marital status, education, and children. If the chi-square results indicated an association between wealth, province, type or residence, or religion for a particular indicator, then that demographic variable was included in the model as well. Results are presented as odds ratios.

Results

Household survey participant demographics

In total, 1477 study participants were surveyed. Their demographic characteristics are shown in the table below. Participants were evenly split between men and women, and among age groups. Slightly more than half were married, had a primary school education, and had at least one child. The majority resided in rural areas. Approximately 40% were Catholic.

Table 2: Demographic characteristics of the household survey participants

	N=1477 n (%)
Sex	
Male	723 (49.0)
Female	754 (51.0)
Age	
15-24	596 (40.4)
25-34	428 (29.0)
35+	453 (30.7)
Marital status	
Single	646 (43.7)
Married, widowed, or divorced	831 (56.3)
Education	
None	155 (10.5)
Primary	829 (56.1)
Secondary	433 (29.3)
Higher	60 (4.1)
Residence	
Urban	353 (23.9)
Rural	1124 (76.1)
Province	
East	328 (22.2)
Kigali City	395 (26.7)
North	283 (19.2)
South	378 (25.6)
West	93 (6.3)
Wealth	
Lowest	262 (17.7)
Second	300 (20.3)
Middle	289 (19.6)
Fourth	306 (20.7)
Highest	320 (21.7)

Children	
Yes	832 (56.3)
No	645 (43.7)
Religion	
Catholic	603 (40.8)
Protestant	220 (14.9)
Christian (not Protestant)	550 (37.2)
Muslim	75 (5.1)
Other	29 (2.0)

Impano n'Impamba listenership

We defined Impano n'Impamba listenership as listening to at least one episode per week, or being able to name at least one character from the radio drama. Based on this criteria, 18% of study participants were classified as Impano n'Impamba listeners. Listeners were further classified as "standard listeners" if they listened at least once a week but were unable to name any characters, and "engaged listeners" if they could name at least one character from Impano n'Impamba.

Table 3: Impano n'Impamba listenership classifications by sex

	Men N=723 n (%)	Women N=754 n (%)	Total N=1477 n (%)
Listenership			
Non-listener	546 (75.5)	662 (87.8)	1208 (81.8)
Standard listener	146 (20.2)	42 (5.6)	188 (12.7)
Engaged listener	30 (4.1)	49 (6.5)	79 (5.3)

Sex, marital status, wealth, and having children were significantly associated with listenership. While all listeners were more likely than non-listeners to be of moderate wealth (second, middle, and fourth quintiles), standard listeners were more likely to be male and married, compared with engaged listeners, who were more likely to be female, unmarried, and without children. Full tables of results can be found in the appendix.

Overall, Ketia and Sandra were most commonly reported as the favorite character of study participants, while Mavumvu and Rukuba were the least favorite characters. Nearly all study participants who had listened to Impano n'Impamba said the radio drama reminded them of their everyday life (97%), and that the characters were similar to people in their lives (98%). Approximately three quarters said Impano n'Impamba was more educational than entertaining. 39% had talked with anyone about the radio drama, most commonly with friends or neighbors. Family planning was the theme from the radio drama most commonly discussed with others (17%), and 6% had discussed fertility.

Table 4: Participant responses to the Impano n'Impamba radio drama by sex

	Men N=187 n (%)	Women N=105 n (%)	Total N=292 n (%)
Favorite character			
Sifa	9 (4.8)	6 (5.7)	15 (5.1)
Barahira	6 (3.2)	1 (1.0)	7 (2.4)
Mavumvu	21 (11.2)	4 (3.8)	25 (8.6)
Ketia	17 (9.1)	16 (15.2)	33 (11.3)
Sandra	15 (8.0)	24 (22.9)	39 (13.4)
Rukuba	10 (5.3)	3 (2.9)	13 (4.5)
Bacyenga	11 (5.9)	4 (3.8)	15 (5.1)
Ngunga	3 (1.6)	1 (1.0)	4 (1.4)
Suzana	18 (9.6)	8 (7.6)	26 (8.9)
Kagaju	9 (4.8)	1 (1.0)	10 (3.4)
Dativa	18 (9.6)	8 (7.6)	26 (8.9)
Twagira	7 (3.7)	2 (1.9)	9 (3.1)
No character mentioned	43 (23.0)	27 (25.7)	70 (24.0)
Least favorite character			
Sifa	2 (1.1)	1 (1.0)	3 (1.0)
Barahira	0 (0.0)	2 (1.9)	2 (0.7)
Mavumvu	15 (8.0)	15 (14.3)	30 (10.3)
Ketia	5 (2.7)	3 (2.9)	8 (2.7)
Rukuba	16 (8.6)	12 (11.4)	28 (9.6)
Bacyenga	8 (4.3)	1 (1.0)	9 (3.1)
Ngunga	9 (4.8)	1 (1.0)	10 (3.4)
Suzana	11 (5.9)	6 (5.7)	17 (5.8)
Kagaju	3 (1.6)	2 (1.9)	5 (1.7)
Dativa	4 (2.1)	0 (0.0)	4 (1.4)
Twagira	8 (4.3)	4 (3.8)	12 (4.1)
No character mentioned	106 (56.7)	58 (55.2)	164 (56.2)
Impano n'Impamba reminds me of my everyday life			
Yes	185 (98.9)	99 (94.3)	284 (97.3)
No	2 (1.1)	6 (5.7)	8 (2.7)
The characters in Impano n'Impamba are similar to people in my everyday life			
Yes	184 (98.4)	101 (96.2)	285 (97.6)
No	3 (1.6)	4 (3.8)	7 (2.4)
Impano n'Impamba is more:			
Educational	148 (79.1)	70 (66.7)	218 (74.7)
Entertaining	2 (1.1)	7 (6.7)	9 (3.1)
Both	37 (19.8)	28 (26.7)	65 (22.3)
Have you talked with anyone about Impano n'Impamba?			
Yes	80 (42.8)	34 (32.4)	114 (39.0)
No	107 (57.2)	71 (67.6)	178 (61.0)

With whom did you discuss Impano n'Impamba?			
Mother	3 (3.7)	6 (16.2)	9 (7.6)
Mother-in-law	0 (0.0)	1 (2.7)	1 (0.8)
Father	0 (0.0)	0 (0.0)	0 (0.0)
Brother	8 (9.9)	2 (5.4)	10 (8.5)
Sister	4 (4.9)	8 (21.6)	12 (10.2)
Friend (female)	13 (16.0)	13 (35.1)	26 (22.0)
Friend (male)	28 (34.6)	2 (5.4)	30 (25.4)
Neighbor	15 (18.5)	4 (10.8)	19 (16.1)
Other	24 (29.6)	8 (21.6)	32 (27.1)
What themes of Impano n'Impamba have you discussed?			
Family planning	31 (16.6)	18 (17.1)	49 (16.8)
Fertility	11 (5.9)	5 (4.8)	16 (5.5)
How to manage pregnancy	18 (9.6)	10 (9.5)	28 (9.6)
Adolescent reproductive health	28 (16.0)	13 (12.4)	41 (14.0)
HIV/AIDS prevention/testing	26 (13.9)	20 (19.0)	46 (15.8)
HIV/AIDS counseling	21 (11.2)	9 (8.6)	30 (10.3)
Gender equality	15 (8.0)	15 (14.3)	30 (10.3)
Nutrition	11 (5.9)	8 (7.6)	19 (6.5)
Other	8 (4.3)	14 (13.3)	22 (7.5)

Fertility awareness

The survey included questions to assess knowledge on fertility awareness, specifically the menstrual cycle, fertile days, male fertility, the onset of fertility, and postpartum fertility. Responses to fertility awareness questions for all study participants (listeners and non-listeners alike) are summarized in Table 5, and disaggregated by sex. Women had higher fertility awareness knowledge than men for nearly all fertility awareness indicators. The percentage of participants with correct knowledge by question are displayed in Figure 3.

Knowledge of the menstrual cycle was low. About half of study participants knew that the length of a typical menstrual cycle is about a month, but only a third knew that the first day of bleeding is the first day of the menstrual cycle. While 78% knew that there are fertile days during the menstrual cycle, only 18% knew that these fertile days occur about halfway between two periods.

A majority of study participants (82%) knew that first menstruation is a sign that a girl is now able to get pregnant, but fewer, 63%, knew that ejaculation is a sign that a boy is now able to get a girl pregnant. About one third knew that men are always fertile, and can possibly get a woman pregnant with unprotected sex at any time.

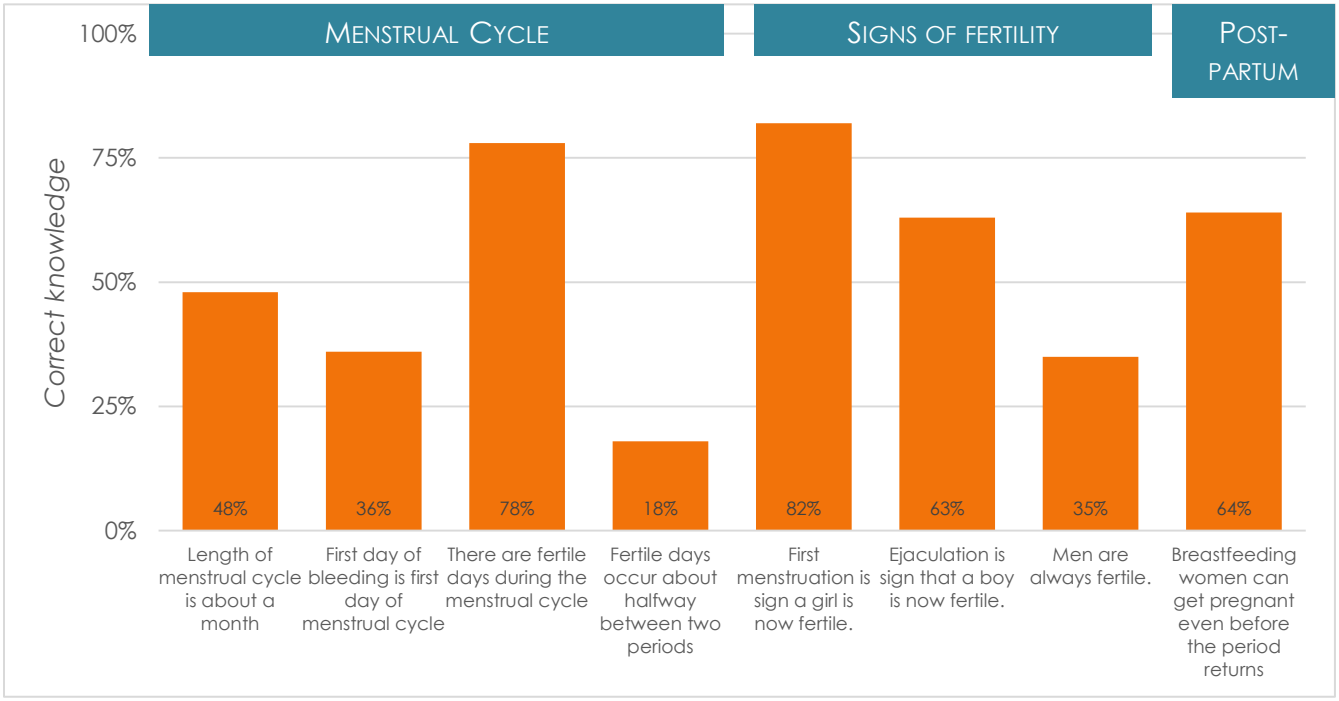
About two thirds were aware that a woman can get pregnant again while she is breastfeeding even before her period returns.

Table 5: Participant responses to fertility awareness questions by sex

	Men N=723 n (%)	Women N=754 n (%)	Total N=1477 n (%)
Typical length of a woman's menstrual cycle in days			
*About a month/26-32 days	265 (36.7)	443 (58.8)	708 (47.9)
Other	90 (12.4)	144 (19.1)	234 (15.8)
Don't know	368 (50.9)	167 (22.1)	535 (36.2)
First day of a woman's menstrual cycle each month			
*First day of her period/bleeding	200 (27.7)	337 (44.7)	537 (36.4)
Other	65 (9.0)	130 (17.2)	195 (13.20)
Don't know	458 (63.3)	287 (38.1)	745 (50.4)
From one period to the next, are there certain days when a woman is more likely to become pregnant?			
*Yes	501 (69.3)	649 (86.1)	1150 (77.9)
No	57 (7.9)	28 (3.7)	85 (5.8)
Don't know	165 (22.8)	77 (10.2)	242 (16.4)
When are the days when a woman is more likely to become pregnant?			
Just before her period begins	177 (24.5)	158 (21.0)	335 (22.7)
During her period	37 (5.1)	21 (2.8)	58 (3.90)
Right after her period has ended	189 (26.1)	240 (31.8)	429 (29.0)
*Several days halfway between two periods	68 (9.4)	201 (26.7)	269 (18.2)
Don't know	30 (4.1)	29 (3.8)	59 (4.0)
There are not certain days during her menstrual cycle when a woman can get pregnant	222 (30.7)	105 (13.9)	327 (22.1)
Best sign that a girl is now able to become pregnant			
*First menstruation/period/bleeding	525 (72.6)	683 (90.6)	1208 (81.8)
Other	83 (11.5)	48 (6.4)	131 (8.9)
Don't know	115 (15.9)	23 (3.1)	138 (9.3)
Best sign that a boy is able to get a girl or a woman pregnant			
*First ejaculation/wet dreams	474 (65.6)	459 (60.9)	933 (63.2)
Other	104 (14.4)	132 (17.5)	236 (16.0)
Don't know	145 (20.1)	163 (21.6)	308 (20.9)
A man can possibly get a woman pregnant anytime he has unprotected sex			
*True	254 (35.1)	262 (34.7)	516 (34.9)
False	426 (58.9)	442 (58.6)	868 (58.8)
Don't know	43 (5.9)	50 (6.6)	93 (6.3)
While breastfeeding a woman can get pregnant again even before her period returns			
*True	492 (68.0)	457 (60.6)	949 (64.3)
False	117 (16.2)	196 (26.0)	313 (21.2)
Don't know	114 (15.8)	101 (13.4)	215 (14.6)

* Correct responses

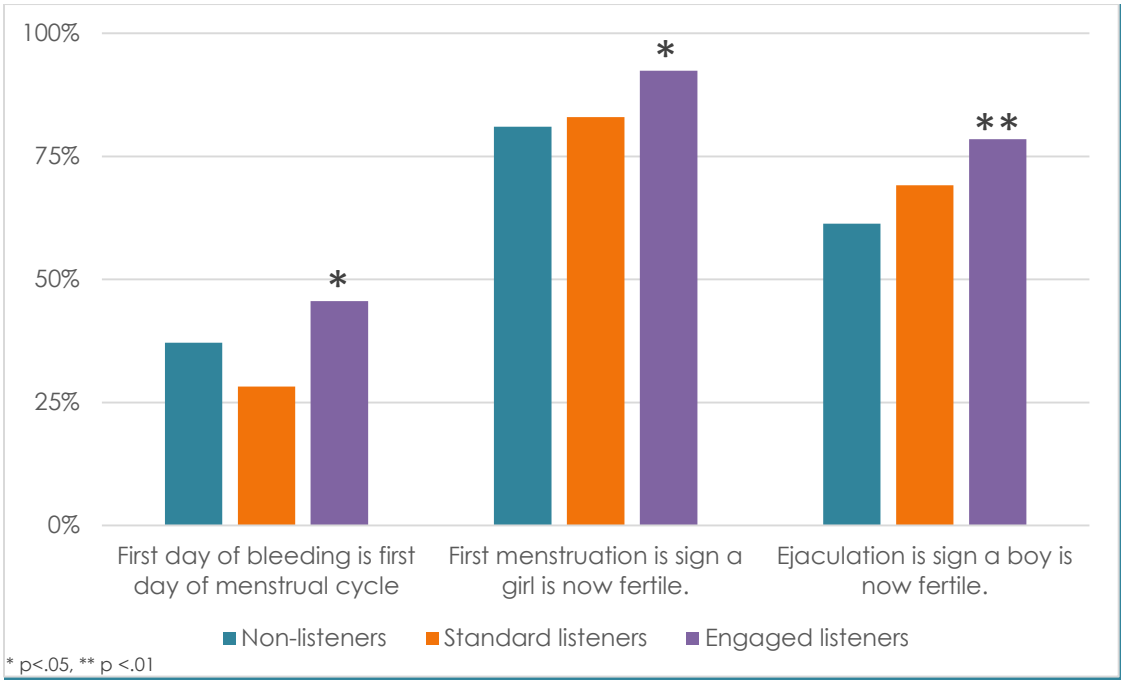
Figure 3. Correct fertility awareness knowledge by topic and question among participants



Differences in fertility awareness between listeners and non-listeners

Chi-square tests were performed to compare fertility awareness knowledge for each question with listenership. The only significant differences in knowledge without controlling for any other variables was for knowledge of the first day of the menstrual cycle, and the signs that girls and boys are now fertile: first menstruation and ejaculation.

Figure 4. Significant increases in knowledge of signs of fertility in girls and boys for listeners compared with non-listeners



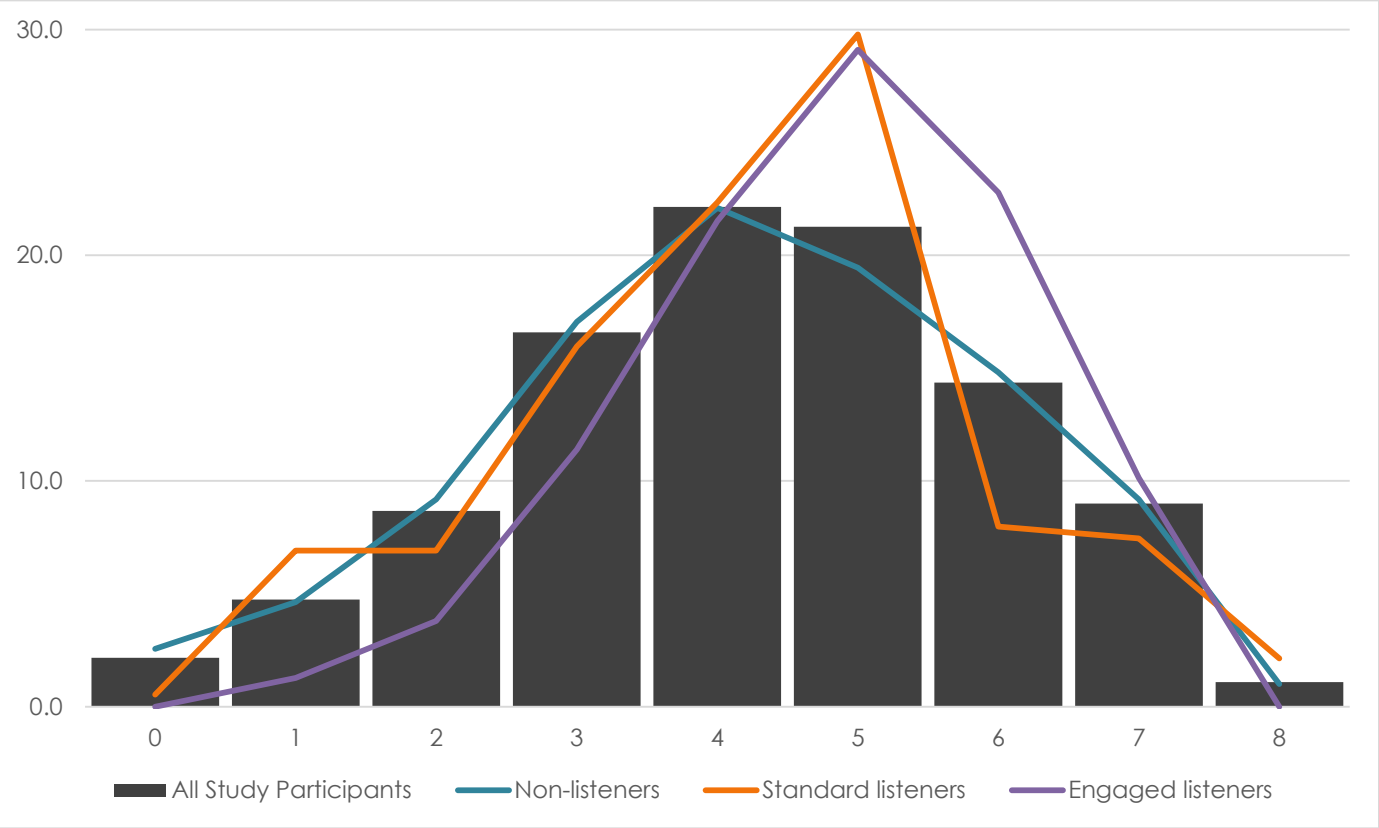
46% of engaged listeners knew the first day of the menstrual cycle is the first day of a woman's period, compared with 37% of non-listeners and 28% of standard listeners. (chi-square value=8.586, df=2, p=.014). 92% of engaged listeners knew that first menstruation is a sign that a girl is now able to become pregnant, compared with 83% of standard listeners, and 81% of non-listeners (chi-square value=6.723, df=2, p=.035). 79% of engaged listeners knew that ejaculation is a sign that a boy is able to get a girl or woman pregnant, compared with 69% of standard listeners, and 61% of non-listeners (chi-square value=12.593, df=2, p=.002). Full tables with results listenership by fertility awareness indicator can be found in the appendix.

Differences in fertility awareness score between listeners and non-listeners

A composite score of fertility awareness was created. One point was awarded for each correct answer. Sixteen study participants received a perfect score of eight, and 32 participants had a score of zero. The distribution of scores is shown in the figure below, and follows a bell curve when all study participants are included. The distribution of scores for non-listeners follows the same bell curve, however for standard and engaged listeners, the scores are skewed to the right, towards the higher scores.

The mean composite fertility awareness score for engaged listeners was 4.8 compared with 4.2 for non-listeners and standard listeners. This was a statistically significant difference as determined by one-way ANOVA ($F(2,27) = 4.664$, $p = .010$).

Figure 5: Distribution of fertility awareness scores by listener classification



Differences in fertility awareness by demographic characteristics

Chi-square tests were performed to compare fertility awareness by key demographic characteristics for each indicator. The demographics used (also shown in Table 2) were: sex, age, marital status, education, type of residence, province, wealth, children, and religion. Many demographic variables were significantly associated with fertility awareness (Table 6). In general, participants with correct fertility awareness were more likely to be: women, older, more educated, married, and have children. Associations with type of residence (urban or rural), province, wealth, and religion were less consistent and varied by question.

Table 6: Summary of demographic characteristics significantly associated with fertility awareness

Demographic	Sex	Age	Marital status	Educ-ation	Type of residence	Province	Wealth	Children	Religion
Group with higher knowledge (unless otherwise noted)	*Women*	*Older*	*Married*	*Higher*			*Higher*	*Have children*	
Length of menstrual cycle	✓	✓	✓	✓				✓	
First day of menstrual cycle	✓	✓	✓	✓				✓	
Fertile days exist	✓	✓	✓	✓			✓	✓	✓
Fertile days occur halfway between two periods	✓		✓	✓	Rural	West			✓

Menstruation is sign of fertility in girls	✓	✓	✓					✓	✓
Ejaculation is sign of fertility in boys		✓		✓	Urban	Kigali	✓		
Men are always fertile						Kigali			
Women can get pregnant while breast-feeding	Men	✓	✓			South		✓	

Differences in fertility awareness knowledge between listeners and non-listeners controlling for demographic characteristics

Listeners (at least one of the two classifications) had higher odds of having correct fertility awareness knowledge that was statistically significant for five questions (summarized in Table 7). The full regression results for these variables are included in the appendix.

The strongest odds was for the sign of fertility in girls. For knowing that menstruation is a sign that a girl is now able to become pregnant, standard listeners had 1.7 higher odds of correct knowledge, and engaged listeners had 3.2 higher odds of correct knowledge than non-listeners. For knowing that ejaculation or having wet dreams is a sign that a boy is now able to get a girl pregnant, engaged listeners had 2.5 higher odds of correct knowledge than non-listeners. Engaged listeners had 1.7 higher odds of correct knowledge on the first day of the menstrual cycle and that women can get pregnant while breastfeeding. Standard listeners had 1.6 higher odds of knowing that fertile days exist than non-listeners.

Table 7: Significant odds ratios for the effect of listenership on fertility awareness when controlling for demographic variables

	Standard listeners		Engaged listeners	
	p-value	*Odds Ratio (95% CI)*	*p-value*	*Odds Ratio (95% CI)*
First day of menstrual cycle	.268	0.8 (0.6 – 1.2)	**.038***	**1.7 (1.0 – 2.7)**
Fertile days exist	**.034***	**1.6 (1.0 – 2.4)**	.567	1.2 (0.6 – 2.2)
Menstruation is sign of fertility in girls	**.020***	**1.7 (1.1 – 2.6)**	**.010***	**3.2 (1.3 – 7.7)**
Ejaculation is sign of fertility in boys	.147	1.3 (0.9 – 1.8)	**.001****	**2.5 (1.4 – 4.5)**
Women can get pregnant while breastfeeding	.670	1.1 (0.8 – 1.5)	**.039***	**1.7 (1.0 – 2.9)**

* p<.05, ** p <01

A binary logistic regression model that looked at the fertility awareness composite score found that the variables significantly associated with having a higher fertility awareness score (≥5) were listenership, sex, age, marital status, and education. Engaged listeners had 2.4 higher odds of high fertility awareness than non-listeners (95% CI 1.5 to 4.0, p=.001) and standard listeners had 1.4 higher odds (95% CI 1.0 – 2.0, p=.031).

Table 8: Binary logistic regression results for higher fertility awareness (composite score ≥5)

	High fertility awareness (score≥6)
Listenership	
Non-Listener	<reference>
Standard listener	1.4 (1.0 – 2.0)*
Engaged listener	2.4 (1.5 – 4.0)**
Sex	
Male	<reference>
Female	2.4 (1.9 – 3.0)***
Age	
15 – 24	<reference>
25 – 34	1.7 (1.2 – 2.5)**
35 +	2.2 (1.5 – 3.4)***
Marital status	
Single	<reference>
Married	1.5 (1.0 – 2.4)*
Education	
None	<reference>
Primary	1.5 (1.0 – 2.4)*
Secondary	3.4 (2.2 – 5.2)***
Higher education	4.2 (2.2 – 8.2)***
Children	
No children	<reference>
Children	1.0 (0.6 – 1.5)

* p<.05, ** p <01, *** p <.001

Factors related to family planning use

The survey included questions related to attitudes, self-efficacy, and social norms related to family planning. Responses to these questions on views on family planning for all study participants (listeners and non-listeners alike) are summarized in Table 9, and disaggregated by sex. The percentage of participants with positive views of family planning by question are displayed in Figure 6.

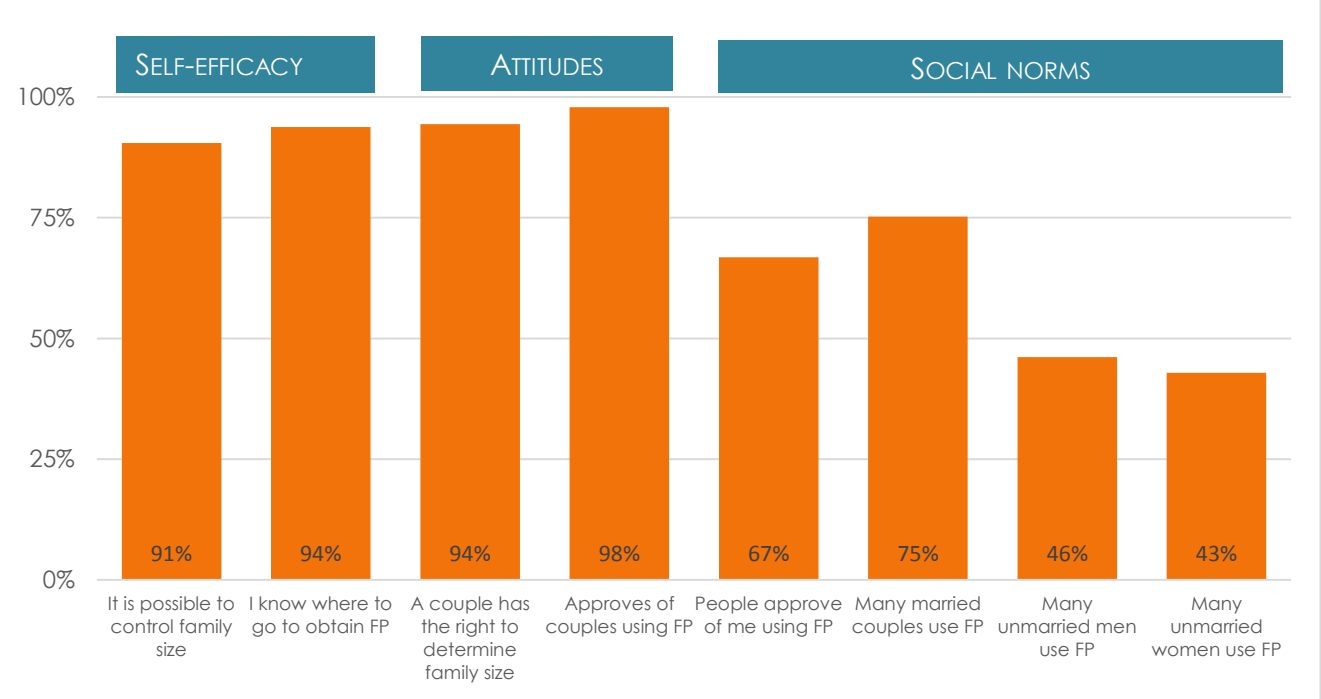
Table 9: Factors related to family planning use (attitudes, self-efficacy, and perceived social norms) by sex

		Men N=723 n (%)	Women N=754 n (%)	Total N=1477 n (%)
Self-efficacy	**It is possible to control family size.**			
	Yes	691 (95.6)	645 (85.5)	1336 (90.5)
	No	17 (2.4)	59 (7.8)	76 (5.1)
	Don't know	15 (2.1)	49 (6.5)	64 (4.3)
	I know where to go to obtain family planning services.			
	Yes	668 (92.4)	717 (95.1)	1385 (93.8)
	No	55 (7.6)	37 (4.9)	92 (6.2)
	I am confident that I can access a family planning method if I want to plan or prevent a pregnancy.			
	Strongly agree	320 (44.3)	406 (53.8)	726 (49.2)
	Agree	357 (49.4)	307 (40.7)	664 (45.0)
	Neutral	18 (2.5)	22 (2.9)	40 (2.7)
	Disagree	26 (3.6)	13 (1.7)	39 (2.6)
	Strongly disagree	2 (.3)	6 (.8)	8 (.5)
Positive attitudes	**A couple has the right to determine the number of children they will have.**			
	Yes	708 (97.9)	687 (91.1)	1395 (94.4)
	No	8 (1.1)	47 (6.2)	55 (3.7)
	Don't know	7 (1.0)	19 (2.5)	26 (1.8)
	Approves of couples using contraception.			
	Approve	714 (98.8)	732 (97.1)	1446 (97.9)
	Disapprove	7 (1.0)	16 (2.1)	23 (1.6)
	Don't know	2 (.3)	5 (.7)	7 (.5)
Perceived supportive norms	**People who are important to me approve of me using family planning**. (Among current family planning users)			
	Yes	244 (71.1)	174 (61.5)	418 (66.8)
	No	30 (8.7)	75 (26.5)	105 (16.8)
	Don't know	69 (20.1)	34 (12.0)	103 (16.5)
	In my community, many married couples use family planning.			
	Yes	512 (70.8)	598 (79.3)	1110 (75.2)
	No	122 (16.9)	69 (9.2)	191 (12.9)
	Don't know	89 (12.3)	86 (11.4)	175 (11.8)
	In my community, many unmarried men use family planning.			
	Yes	404 (55.9)	277 (36.7)	681 (46.1)
	No	131 (18.1)	188 (24.9)	319 (21.6)
	Don't know	188 (26.0)	288 (38.2)	476 (32.2)
	In my community, many unmarried women use family planning.			
	Yes	348 (48.1)	285 (37.8)	633 (42.9)
	No	161 (22.3)	187 (24.8)	348 (23.6)
	Don't know	214 (29.6)	281 (37.3)	495 (33.5)

Study participants had positive attitudes about family planning and high self-efficacy to access and use family planning. More than 90% believed it was possible to control family size, said that a couple has the right to determine family size, and personally approve of couples using family planning. Knowledge about where to obtain family planning, and confidence in being able to access a family planning method were also high at 94%.

Perceived supportive norms about family planning and use in the community was lower. While 75% of participants said that many couples in their community use family planning, the percentage decreased to 46% and 43% for use by unmarried men and unmarried women in their communities. Among those who were currently using a family planning method, about two-thirds said that people who are important to them approve of their family planning use.

Figure 6: Factors related to family planning use among all participants (listeners and non-listeners alike)



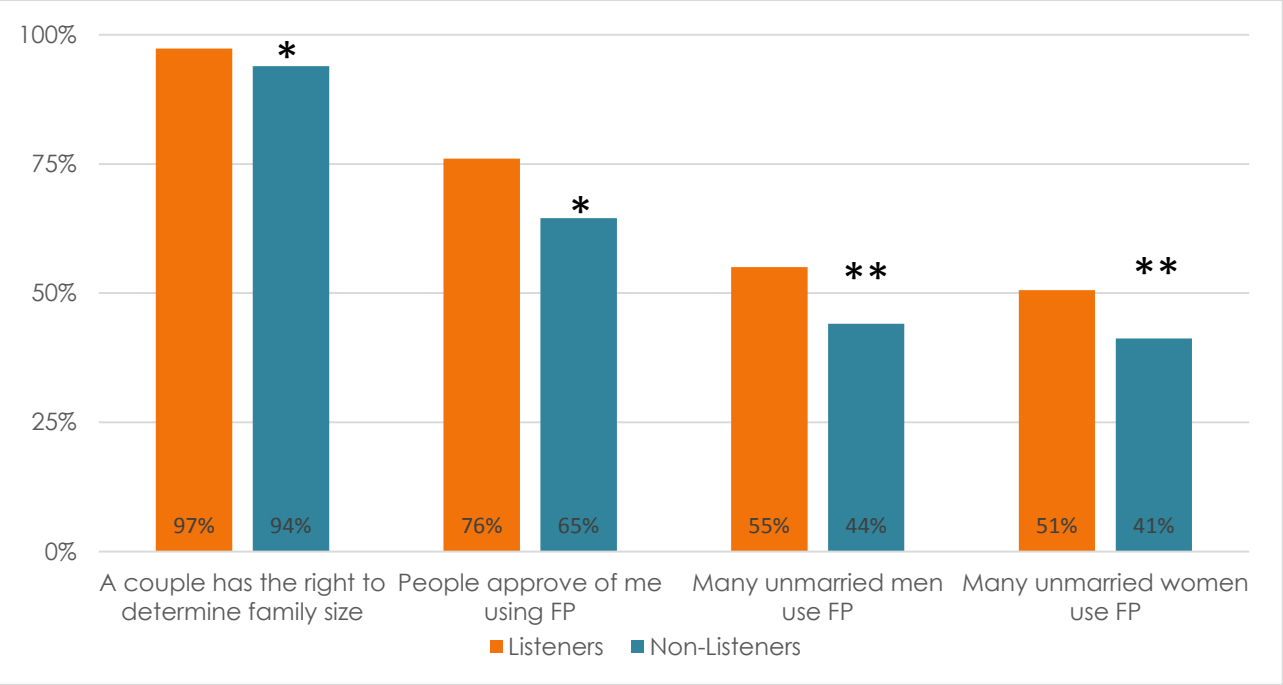
Differences in family planning views between listeners and non-listeners

Chi-square tests were performed to compare views on family planning with listenership. Significant differences between listeners and non-listeners without controlling for any other variables were found for four indicators: a couple has the right to determine family size, people approve of me using family planning, many unmarried men use family planning, and many unmarried women use family planning.

97% of listeners believed that a couple has the right to determine the number of children they will have, compared with 94% of non-listeners (chi-square value=5.173, df=1, p=.023). 76% of listeners currently using family planning reported that people who are important to them approve of their use of family planning, compared with 65% of non-listeners (chi-square value=5.604, df=1, p=.018). 55% of listeners believed many unmarried men in their community use family planning, compared

with 44% of non-listeners (chi-square value=10.520, df=1, p=.001). 51% of listeners believed many unmarried women in their community use family planning, compared with 41% of non-listeners (chi-square value=7.781, df=1, p=.005). Full tables with results for each indicator can be found in the appendix.

Figure 7: Significant increases in attitudes and social norms on family planning for listeners compared with non-listeners



* p<.05, ** p <.01

Differences in family planning views between listeners and non-listeners controlling for demographic characteristics

Binary logistic regression was performed to ascertain the effects of listenership on family planning views, while controlling for demographic variables. Listeners had higher odds of having a positive view on family planning that was statistically significant for four family planning views. The full results are included in the appendix.

Table 10: Significant odds ratios for the effect of listenership on positive views of family planning when controlling for demographic variables

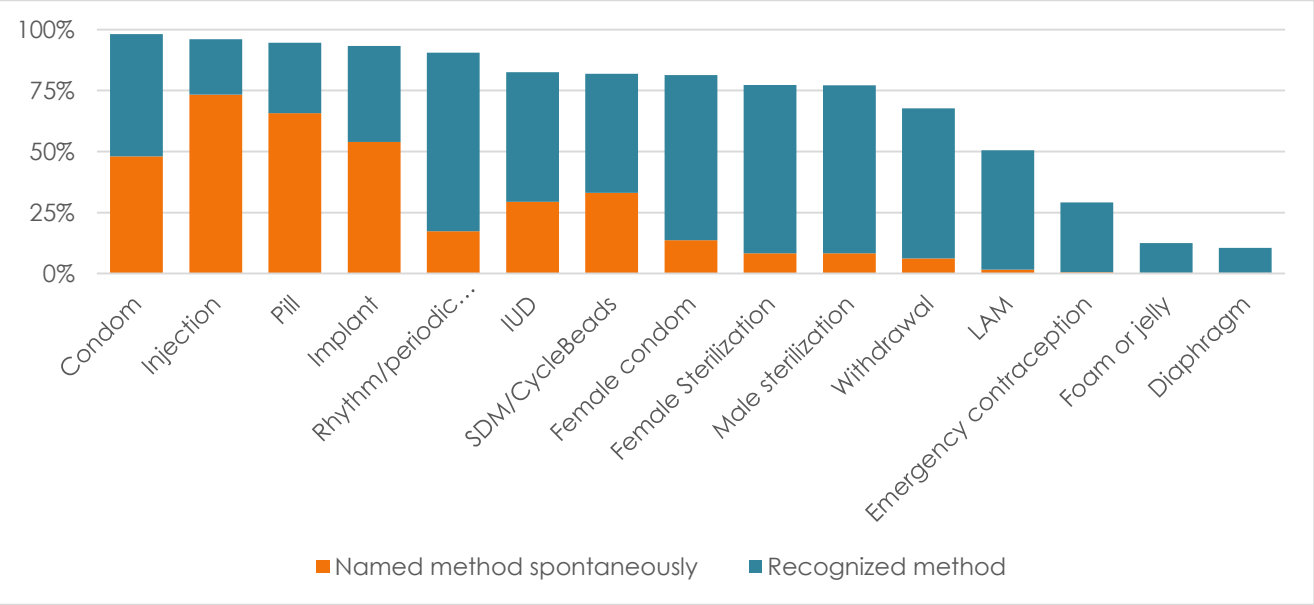
	Listeners	
	p-value	*Odds Ratio (95% CI)*
Married couples use family planning	.036*	1.4 (1.0 – 2.0)
Unmarried men use family planning	.047*	1.3 (1.0 – 1.8)
Unmarried women use family planning	.030*	1.4 (1.0 – 1.8)
I know where to go to access family planning	.028*	2.2 (1.1 – 4.4)

The strongest odds was knowing where to go to access family planning, listeners had 2.2 higher odds of this view, compared with non-listeners. For the belief that married couples, unmarried men, and unmarried women use family planning, listeners had 1.4, 1.3, and 1.4 higher odds respectively of holding these views, compared with non-listeners.

Knowledge of family planning methods

Study participants were asked about the family planning methods they had heard about (which they named spontaneously), and then asked whether they had heard about 15 different methods of family planning which were named individually. 94% of participants were able to name at least one method of family planning spontaneously, and 99% were able to recognize at least one method of family planning. Knowledge by method varied, and is displayed in Figure 8.

Figure 8: Knowledge of family planning methods among household study participants



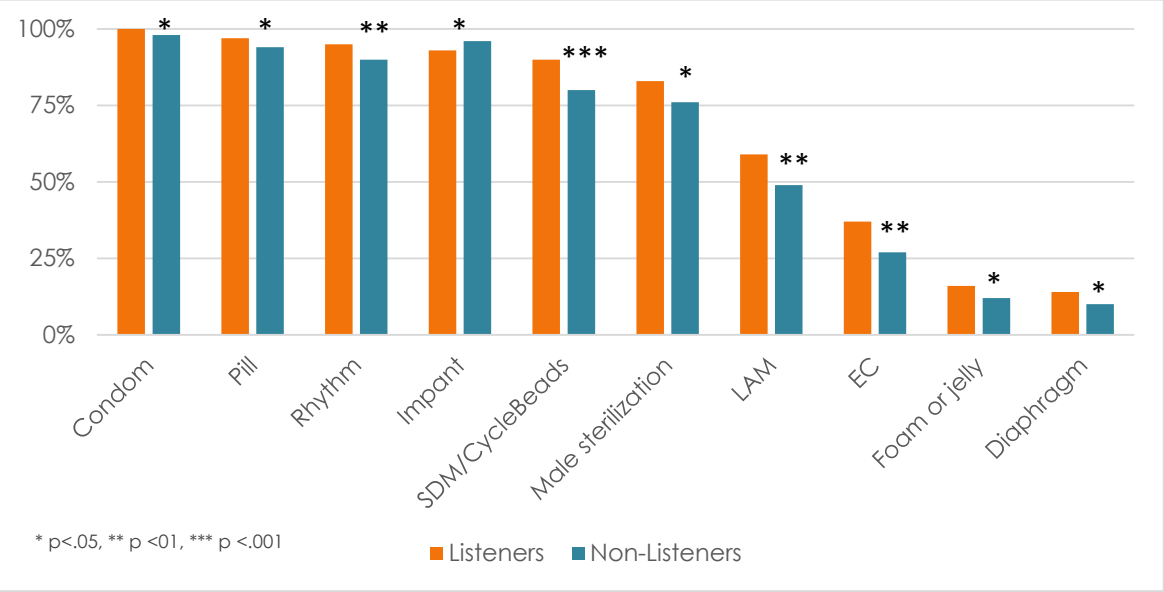
Differences in knowledge of family planning methods between listeners and non-listeners

Significant differences between listeners and non-listeners without controlling for any other variables were found for being able to name at least one method spontaneously and ten family planning methods: male sterilization, pill, implant, male condoms, diaphragm, foam or jelly, LAM, SDM, rhythm/periodic abstinence, and emergency contraception.

97% of listeners could spontaneously name at least one family planning method, compared with 93% of non-listeners (chi-square value=7.487, df=1, p=.006). 83% of listeners had heard of male sterilization, compared with 76% of non-listeners (chi-square value=5.711, df=1, p=.017). 97% of listeners had heard of the contraceptive pill, compared with 94% of non-listeners (chi-square value=4.808, df=1, p=.028). 96% of listeners had heard of the implant, compared with 93% of non-listeners (chi-square value=4.582, df=1, p=.032). 100% of listeners had heard of male condoms, compared with 98% of non-listeners (chi-square value=5.850, df=1, p=.016). 14% of listeners had

heard of the diaphragm, compared with 10% of non-listeners (chi-square value=4.071, df=1, p=.044). 16% of listeners had heard of foam or jelly, compared with 12% of non-listeners (chi-square value=3.935, df=1, p=.047). 59% of listeners had heard of LAM, compared with 49% of non-listeners (chi-square value=8.969, df=1, p=.003). 90% of listeners had heard of SDM, compared with 80% of non-listeners (chi-square value=15.179, df=1, p<.001). 95% of listeners had heard of the rhythm method, compared with 90% of non-listeners (chi-square value=6.849, df=1, p=.009). 37% of listeners had heard of emergency contraception, compared with 27% of non-listeners (chi-square value=9.916, df=1, p=.002).

Figure 9: Significant increases in knowledge of specific family planning methods for listeners compared with non-listeners



Family planning use

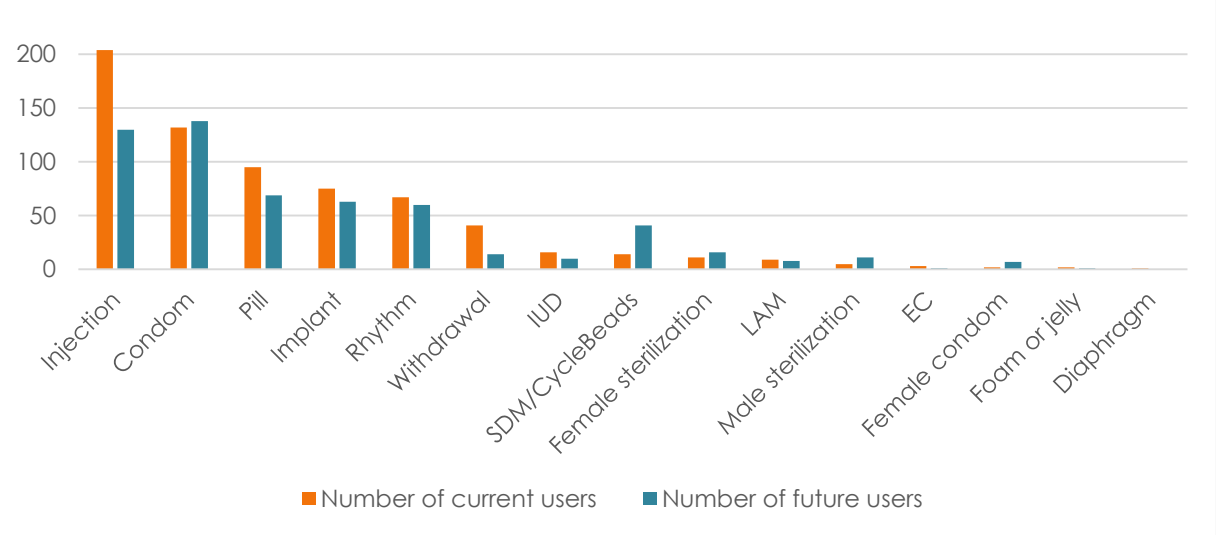
At the time of the interview, 42% of study participants were currently using any method of family planning, and 37% were using a modern method of family planning (emergency contraception, male or female condoms, male or female sterilization, pill, IUD, injection, implant, LAM, or SDM). The majority (73%) had been using their current method for a year or more. Among individuals not currently using a family planning method, 58% said they planned any method of family planning in the future, and 52% said they planned to use a modern method of family planning in the future.

The most commonly used family planning method was injection, followed by male condoms, the pill, implant, the rhythm method, and withdrawal.

Table 11: Family planning use by sex

	Men N=723 n (%)	Women N=754 n (%)	Total N=1477 n (%)
Current family planning use			
Any method	343 (47.4)	283 (37.5)	626 (42.4)
Modern method	285 (39.4)	255 (33.8)	540 (36.6)
Length of time using current method (Among current family planning users)			
3 months	48 (14.0)	51 (18.0)	99 (15.8)
6 months	20 (5.8)	22 (7.8)	42 (6.7)
9 months	18 (5.2)	10 (3.5)	28 (4.5)
12 months or more	257 (74.9)	200 (70.7)	457 (73.0)
Intends to use family planning in the future (Among current non-users)			
Any method	258 (67.9)	233 (49.5)	491 (57.7)
Modern method	232 (61.1)	208 (44.2)	440 (51.7)

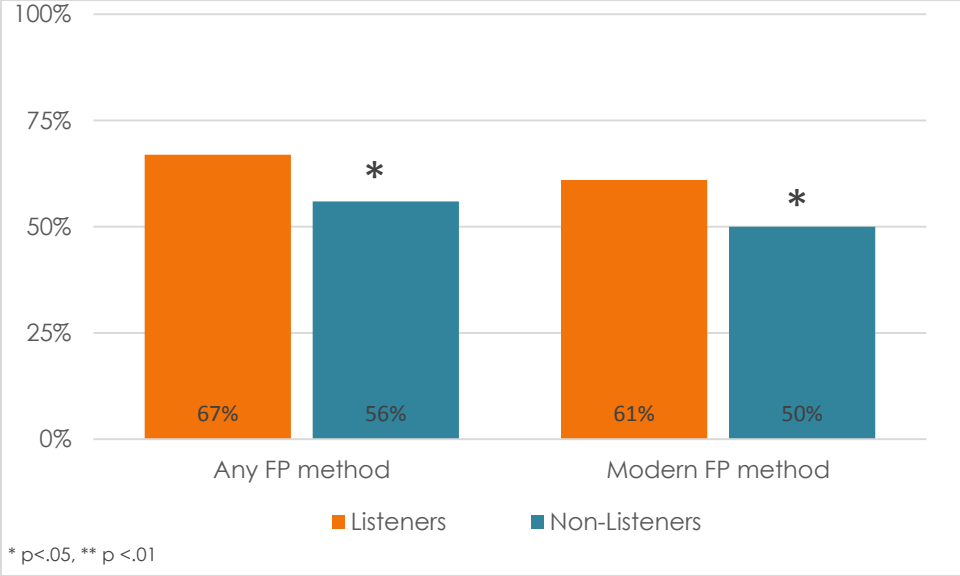
Figure 10: Number of current and future family planning users by method



Differences in family planning use between listeners and non-listeners

There were no statistically significant differences in current family planning use between listeners and non-listeners. However, among participants who were not currently using a family planning method, listeners were more likely than non-listeners to report an intention to use a family planning method in the future. 67% of listeners intended to use any method of family planning in the future, compared with 56% of non-listeners (chi-square value=5.982, df=1, p=.014). 61% of listeners intended to use a modern method of family planning in the future, compared with 50% of non-listeners (chi-square value=6.760, df=1, p=.009). Full tables of results can be found in the appendix.

Figure 11: Significant increase in intention to use family planning in the future for listeners compared with non-listeners



Predictors of family planning use

Binary logistic regression analyses were used to look at the predictors of current family planning use and future intention to use family planning. Each model included fertility awareness (high vs. low score), listenership, sex, age, marital status, education, children, and religion (for current use only).

When controlling for all of these variables, the effects of fertility awareness and listenership on family planning use were not significant. Men, participants between the ages of 25 and 34, and participants with children had significantly higher odds of being current family planning users. Men and participants under the age of 35 had higher odds of intentions to use family planning in the future.

Table 12: Binary logistic regression results for family planning use

	Current family planning use	Intention to use family planning in the future
Listenership		
Non-Listener	<reference>	<reference>
Listener	1.1 (0.8 - 1.5)	1.3 (0.9 - 2.0)
Fertility awareness		
High (≥6)	1.1 (0.8 - 1.4)	1.0 (0.8 - 1.4)
Low (<6)	<reference>	<reference>
Sex		
Male	2.1 (1.6 - 2.7)***	2.7 (2.0 - 3.7)***
Female	<reference>	<reference>
Age		
15 – 24	<reference>	7.1 (3.8 - 13.4)***
25 – 34	1.7 (1.2 - 2.5)**	7.8 (4.6 - 13.2)***
35 +	0.7 (0.5 - 1.1)	<reference>

Marital status		
Single	<reference>	<reference>
Married	1.4 (0.9 - 2.3)	1.5 (0.9 - 2.5)
Education		
None	<reference>	<reference>
Primary	1.0 (0.7 - 1.4)	1.1 (0.6 - 1.9)
Secondary	1.0 (0.6 - 1.6)	1.2 (0.7 - 2.1)
Higher education	2.1 (1.0 - 4.3)*	1.4 (0.5 - 3.8)
Children		
No children	<reference>	1.2 (0.6 - 2.1)
Children	8.9 (5.4 - 14.5)***	<reference>
Religion		n/a
Catholic	<reference>	
Protestant	0.8 (0.6 - 1.2)	
Christian	0.9 (0.7 - 1.2)	
Muslim	1.4 (0.8 - 2.4)	
Other	2.2 (0.9 - 5.5)	

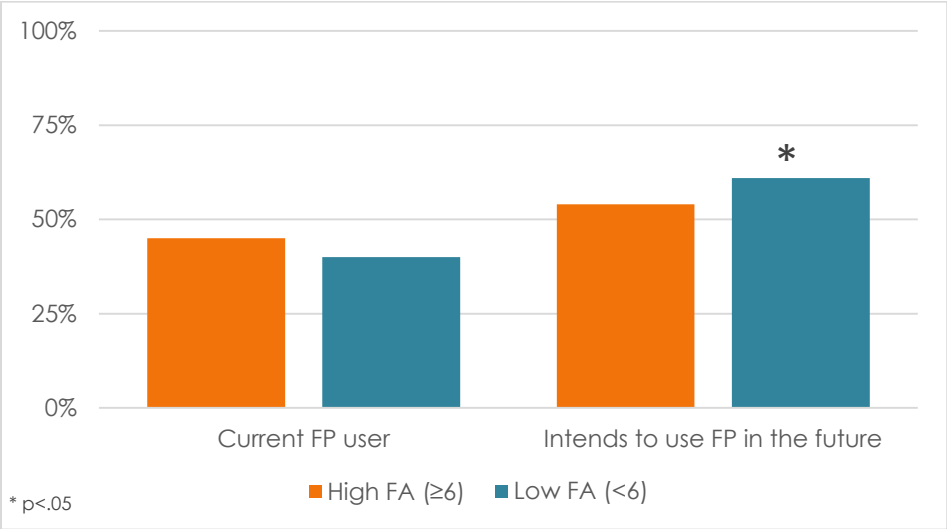
* p<.05, ** p <.01, *** p <.001

Fertility awareness and family planning use

The relationship between fertility awareness and family planning use was explored, using chi squares to compare family planning use with overall fertility awareness score, and individual fertility awareness questions.

45% of participants with a high FA score, compared with 40% of participants with low fertility awareness were currently using a family planning method, but the difference was not statistically significant (chi-square value=2.829, df=1, p=.093). Additionally, there was a statistically significant difference in intention to use family planning in the future based on fertility awareness, however, the direction is the opposite of what would be expected. 61% of participants with low fertility awareness reported an intention to use family planning in the future, compared with 54% of participants with high fertility awareness (chi-square value=4.524, df=1, p=.033).

Figure 12: Relationship between fertility awareness and family planning use among participants



There was a statistically significant difference in current family planning use by correct fertility awareness knowledge for two indicators: knowing that there are fertile days during the menstrual cycle, and that it is possible to get pregnant while breastfeeding. These indicators were put in a binary logistic regression model while controlling for sex, age, marital status, education, children, and religion. When controlling for these demographic variables, only knowing that there are fertile days during the menstrual cycle was a significant predictor of current family planning use. Study participants who knew that there are fertile days during the menstrual cycle had 1.4 higher odds of currently using family planning then participants with incorrect knowledge. Full regression results are in the appendix.

There was a statistically significant difference in intention to use family planning in the future by fertility awareness knowledge for two indicators: the menstrual cycle is about a month and fertile days occur about halfway between two cycles. However, these fertility awareness indicators were not significant when put into a binary logistic regression model that controlled for demographic variables.

Communication about family planning and fertility awareness

The survey included questions related to communication about family planning and fertility awareness, as well as views on social norms around seeking information and advice as needed. Responses to these questions are summarized in Table 13, and disaggregated by sex.

Questions related to communication asked about the 3 months prior to the interview. During that time, approximately 65% of married study participants had discussed family planning with their partner, and 28% of all study participants (regardless of marital status) had discussed family planning with someone, most commonly with friends or neighbors. One quarter of participants had discussed fertile days during the menstrual cycle, most commonly with their partner or with friends.

Approximately one third of participants strongly agreed with three statements: people seek information on family planning, people seek information on menstruation, and I feel comfortable talking about menstruation.

Table 13: Communication about family planning and fertility awareness by sex

	Men N=723 n (%)	Women N=754 n (%)	Total N=1477 n (%)
Discussed family planning with partner in the past 3 months (Among married participants)			
Yes	259 (64.1)	244 (65.4)	503 (64.7)
No	145 (35.9)	129 (34.6)	274 (35.3)
Discussed family planning with family, friends, or neighbors in the past 3 months			
Yes	190 (26.3)	233 (30.9)	423 (28.6)
No	533 (73.7)	521 (69.1)	1054 (71.4)
Who:			
Mother	10 (5.3)	18 (7.7)	28 (6.6)
Mother-in-law	1 (0.5)	9 (3.9)	10 (2.4)
Father	8 (4.2)	1 (0.4)	9 (2.1)
Brother	12 (6.3)	4 (1.7)	16 (3.8)
Sister	9 (4.7)	31 (13.3)	40 (9.5)
Friend (female)	30 (15.8)	163 (70.0)	193 (45.6)
Friend (male)	76 (40.0)	8 (3.4)	84 (19.9)
Neighbor	82 (43.2)	111 (47.6)	193 (45.6)
Other	26 (13.7)	24 (10.3)	50 (11.8)
Discussed fertile days during the menstrual cycle with anyone in the past 3 months			
Yes	150 (20.7)	206 (27.3)	356 (24.1)
No	573 (79.3)	548 (72.7)	1121 (75.9)
Who:			
Partner	46 (30.7)	38 (18.4)	84 (23.6)
Mother	2 (1.3)	9 (4.4)	11 (3.1)
Mother-in-law	0 (0.0)	2 (1.0)	2 (0.6)
Father	0 (0.0)	0 (0.0)	0 (0.0)
Father-in-law	2 (1.3)	0 (0.0)	2 (0.6)
Sibling	11 (7.3)	29 (14.1)	40 (11.2)
Friend	72 (48.0)	108 (52.4)	180 (50.6)
Provider	14 (9.3)	23 (11.2)	37 (10.4)
Son	3 (2.0)	2 (1.0)	5 (1.4)
Daughter	2 (1.3)	19 (9.2)	21 (5.9)
Other	24 (16.0)	21 (10.2)	45 (12.6)
People who are important to me seek information and advice on how to plan or prevent a pregnancy			
Strongly agree	170 (23.5)	287 (38.1)	457 (30.9)
Agree	438 (60.6)	335 (44.4)	773 (52.3)
Neutral	41 (5.7)	66 (8.8)	107 (7.2)
Disagree	67 (9.3)	32 (4.2)	99 (6.7)
Strongly disagree	7 (1.0)	34 (4.5)	41 (2.8)

People who are important to me seek information and advice about issues related to menstruation			
Strongly agree	197 (27.2)	308 (40.8)	505 (34.2)
Agree	462 (63.9)	342 (45.4)	804 (54.4)
Neutral	23 (3.2)	47 (6.2)	70 (4.7)
Disagree	39 (5.4)	22 (2.9)	61 (4.1)
Strongly disagree	2 (0.3)	35 (4.6)	37 (2.5)
I feel comfortable talking about issues related to menstruation.			
Strongly agree	142 (19.6)	359 (47.6)	501 (33.9)
Agree	440 (60.9)	319 (42.3)	759 (51.4)
Neutral	42 (5.8)	13 (1.7)	55 (3.7)
Disagree	92 (12.7)	28 (3.7)	120 (8.1)
Strongly disagree	7 (1.0)	35 (4.6)	42 (2.8)

Differences in communication about family planning and fertility awareness between listeners and non-listeners

Chi-square tests were performed to compare communication and discussion of family planning and fertility awareness with listenership. The only statistically significant difference between listeners and non-listeners was for discussion of family planning with someone other than your partner (friends, family, or neighbors) in the last 3 months. 34% of listeners had discussed family planning with someone, compared with 28% of non-listeners (chi-square value=4.655, df=1, p=.031). This difference was still significant when controlling for demographic variables in a binary logistic regression model. Listeners had 1.6 higher odds of discussing family planning with someone other than their partner compared with non-listeners (95% CI 1.2 to 2.1, p=.004). Full regression results in the appendix.

Discussion

Given widespread misunderstanding of pregnancy risk, the Impano n'Impamba radio drama storylines incorporated information on fertility awareness with an overarching goal of reducing unmet need for family planning. Listeners of the radio drama had higher fertility awareness, particularly related to signs of fertility in adolescents, postpartum fertility, and the beginning of the menstrual cycle. These differences were modest, with odds ratios ranging from 1.7 to 3.2, and listenership was not as strong a predictor of fertility awareness as some sociodemographic characteristics, specifically sex, age, and education. Additionally, listeners were more likely to report knowledge of family planning methods, supportive norms, self-efficacy to obtain a method, and discussing family planning with others. There were no differences between listeners and non-listeners for current family planning use, or intention to use family planning in the near future.

There are several explanations for why listeners were more likely to have correct knowledge of some, but not all of the fertility awareness concepts. The variation in understanding among listeners could be related to exposure to the messages. Even though standard and engaged listeners heard the radio drama regularly, some fertility awareness concepts were more clearly and frequently integrated into the episodes than others. In Ketia's story on adolescence, the signs of fertility onset for boys and girls were mentioned multiple times, as were messages around

menstruation management, whereas messages explaining the when during the menstrual cycle fertile days occur were mentioned less frequently. If listeners missed an episode, they may have missed key information.

The limited inclusion of certain fertility awareness messages may be due to the script writers' lack of clarity around these concepts. This points to the need for strong capacity building activities when communicating technical information to creative staff. Additionally, Impano n'Impamba had multiple behavior change objectives and competing donors priorities to balance, which influenced the messages that were included in the radio drama. Clear communication and buy-in from all partners and creative staff is required for coordination of storylines to meet the multiple objectives. Future radio dramas with the aim of increasing fertility awareness will need to consider which messages are central to the desired behavior change and focus on conveying these clearly and frequently.

Individual exposure to the fertility awareness messages is also important, and may have varied based on how people listened to the radio drama. While the literature provided no clear or consistent definition of listenership, definitions were primarily based on frequency, and ranged from having listened yesterday to listening daily, weekly, or monthly. Defining listenership was crucial to our analysis, and we found differences between individuals who could name at least one character and those who could not, even though both groups reported listening to the radio drama at the same frequency. Our in-depth interviews suggest that many people listened to Impano n'Impamba passively while completing other tasks, and this was particularly true of men. Fully understanding all of the fertility awareness concepts may have required more close listening.

Since accurate fertility awareness may contradict widespread cultural beliefs about pregnancy, listeners may not initially be receptive to the new information. This is particularly true of postpartum risk of pregnancy, with many believing that women cannot get pregnant while they are breastfeeding, or as long as their periods have not returned. Additional efforts may be needed to generate critical reflection and discussion that allows for reexamination of common beliefs.

Our experience with Impano n'Impamba found that interpersonal discussion and communication in the community discussion groups with a knowledgeable facilitator who could answer questions was invaluable in clarifying some of the specific information in the radio drama that was confusing. Discussion groups and other transmedia elements may need to be combined with longer narrative-based storytelling interventions to increase fertility awareness and change behavior related to family planning use. Impano n'Impamba was limited by an insufficient budget for transmedia and community engagement elements, but future radio dramas should not underestimate their importance.

While there were not differences between Impano n'Impamba listeners and non-listeners for family planning use, the increase in fertility awareness and other intermediate factors that could influence family planning uptake is encouraging. Increasing family planning use in countries like Rwanda where the contraceptive prevalence rate is already high requires addressing cultural and attitudinal resistance to family planning. This change happens over time and must address community-level norms that influence behavior. This may be best achieved through multi-pronged interventions of which radio is one of several components.

Recommendations

- Conduct formative research to identify which aspects of fertility awareness are most relevant for the audience and inform local adaptation of messages. There are many facts related to pregnancy risk and how the body works. Identify the target audience and explore their needs, values, and social norms so that appropriate messages can be selected. Conveying fertility awareness should remain simple and relevant. A small number of well-crafted messages which resonate is more powerful than sharing a lot of different information.
- Take time to understand fertility awareness. IRH has developed a series of messages based on reproductive biology which can help people understand how their bodies work. It is critical to convey this information correctly and simply throughout the storylines.
- Use characters and storylines that the audience can relate to. With the Sabido Methodology, "positive," "negative," and "transitional" characters model behaviors over time. They reflect relevant role models for the listeners and demonstrate realistic consequences from a range of life choices. The tension between positive and negative encourages self-reflection and discussion.
- Measure impact by assessing changes in knowledge, attitudes, and behaviors among listeners before and after the serial radio drama.
- Use transmedia elements to reinforce content from the serial radio drama and spark critical reflection and discussion among listeners. This can include established listener group, radio talk shows where DJs discuss the drama with callers, social media discussion, and other community events. Applying fertility awareness to one's own circumstances requires the individual to reflect on the information and confirm its applicability, especially if it seems to contradict other stories or experiences in the community. Therefore, any opportunity to continue the reflection and discussion is beneficial.

Conclusion

Impano n'Impamba increased fertility awareness and other immediate factors that could influence family planning uptake, and provided invaluable lessons for future interventions with the aim of increasing fertility awareness to improve sexual and reproductive health behaviors. The first is that exposure to messages, both at the intervention and individual levels is important. Interventions with the aim of increasing fertility awareness will need to consider which messages are central to the desired behavior change and focus on conveying these clearly and frequently. Additionally, evaluations of radio interventions should carefully consider how listenership is defined. Secondly, increases in fertility awareness and family planning behaviors may be best achieved through multi-pronged interventions of which radio is one of several components, and the importance of transmedia and community engagement elements should not be underestimated.

Appendix 1: Key Fertility Awareness Messages in Impano n'Impamba

Themes	Messages
Fertility – General	Fertile days are those when a woman can get pregnant. A woman is fertile only on certain days each month around the middle of her cycle.
Fertility – General	A man is always fertile. If he has sex with a woman on her fertile days, she can get pregnant.
Fertility – General	For a woman to become pregnant, the man and woman must have sex on one of the fertile days of the woman's cycle.
Fertility – General	It is the man's sperm that determines the sex of the baby.
Fertility – Menstrual Cycle	A menstrual cycle is all of the days from the beginning of a woman's bleeding to the next month's bleeding.
Fertility – Menstrual Cycle	Menstruation (bleeding/period) is a healthy sign that a girl or woman is physically able to become pregnant. However, if she is menstruating, she is not pregnant that time.
Fertility – Menstrual Cycle	A woman who has a regular menstrual cycle gets her periods about a month apart, or every 26-32 days. Not all women and girls have a menstrual cycle that lasts exactly 28 days. Some cycles are shorter and some are longer.
Fertility – Menstrual Cycle	Women who usually have menstrual cycles between 26 and 32 days long are most likely to be fertile on days 8-19 of their cycles. If a woman has unprotected sex during this fertile time, pregnancy is likely.
Fertility – Menstrual Cycle	A woman releases one egg in the middle of her menstrual cycle. If she has sex without condoms during her fertile days, she can become pregnant.
Fertility – Cervical secretions	Sometimes women see a whitish liquid in their knickers or feel wetness in their private parts – this liquid is called cervical secretions and is healthy and normal. When she sees this liquid, she is fertile and can become pregnant if she has unprotected sex that day.
Fertility – Cervical secretions	Cervical secretions are a healthy part of a woman's natural fertility cycle. Do not try to wash them away or use [tampons, herbs, etc.] to dry them.
Fertility – Post-partum	Breastfeeding can delay the return to fertility. But breastfeeding alone is not sufficient to prevent pregnancy. It is possible for a woman to become pregnant while breastfeeding.
Fertility – Post-partum	A woman's fertility will return between 2-9 months after the birth of her child. She may be fertile even before her menstruation returns.
Fertility – Post-partum	Breastfeeding won't protect a woman from pregnancy if the baby eats food or liquids other than breast milk, menstruation has returned, or it's been over 6 months since birth.
Fertility – Puberty, Girls	When a girl starts having monthly bleeding, it means that her body is able to get pregnant if she has sex. It does not mean that her body and mind are ready to have a baby. It only means that she is physically able to get pregnant.
Fertility – Puberty, Boys	Around the time of puberty, a boy becomes able to get a girl pregnant and his body changes in noticeable ways as he grows to become a man.

Appendix 2: In-depth Results Tables

Table 1: Demographic characteristics of Impano n'Impamba listeners and non-listeners

	Non-listeners N=1208 n (%)	Standard listeners N=188 n (%)	Engaged listeners N=79 n (%)	Chi-square p-value
Sex				<.001***
Male	546 (45.2)	146 (77.7)	30 (38.0)	
Female	662 (54.8)	42 (22.3)	49 (62.0)	
Age				.064
15-24	485 (40.1)	66 (35.1)	43 (54.4)	
25-34	353 (29.2)	59 (31.4)	16 (20.3)	
35+	370 (30.6)	63 (33.5)	20 (25.3)	
Marital status				.009**
Single	523 (43.3)	74 (39.4)	47 (59.5)	
Married	685 (56.7)	114 (60.6)	32 (40.5)	
Education				.309
None	132 (10.9)	20 (10.6)	3 (3.8)	
Primary	671 (55.5)	106 (56.4)	51 (64.6)	
Secondary	356 (29.5)	52 (27.7)	24 (30.4)	
Higher	49 (4.1)	10 (5.3)	1 (1.3)	
Residence				.305
Urban	298 (24.7)	38 (20.2)	16 (20.3)	
Rural	910 (75.3)	150 (79.8)	63 (79.7)	
Province				n/a
East	287 (23.0)	30 (16.0)	20 (25.3)	
Kigali City	338 (28.0)	43 (22.9)	13 (16.5)	
North	228 (18.9)	41 (21.8)	14 (17.7)	
South	291 (24.1)	57 (30.3)	29 (36.7)	
West	73 (6.0)	17 (9.0)	3 (3.8)	
Wealth				<.001***
Lowest	233 (19.3)	20 (10.6)	8 (10.1)	
Second	240 (19.9)	39 (20.7)	21 (26.6)	
Middle	225 (18.6)	46 (24.5)	18 (22.8)	
Fourth	231 (19.1)	53 (28.2)	22 (27.8)	
Highest	279 (23.1)	30 (16.0)	10 (12.7)	
Children				.026*
Yes	691 (57.2)	108 (57.4)	33 (41.8)	
No	517 (42.8)	80 (42.6)	46 (58.2)	
Religion				n/a
Catholic	483 (40.0)	81 (43.1)	39 (49.4)	
Protestant	181 (15.0)	30 (16.0)	9 (11.4)	
Christian	452 (37.4)	69 (36.7)	27 (34.2)	
Muslim	64 (5.3)	7 (3.7)	4 (5.1)	
Other	28 (2.3)	1 (0.5)	0 (0.0)	

* p<.05, ** p <.01, *** p <.001

Table 2: Fertility awareness of Impano n'Impamba listeners and non-listeners

	Non-listeners N=1208 n (%)	Standard listeners N=188 n (%)	Engaged listeners N=79 n (%)	Chi-square p-value
Typical length of a woman's menstrual cycle is about a month.				.136
Incorrect	627 (51.9)	106 (56.4)	34 (43.0)	
Correct	581 (48.1)	82 (43.6)	45 (57.0)	
First day of bleeding is first day of a woman's menstrual cycle.				.014*
Incorrect	760 (62.9)	135 (71.8)	43 (54.4)	
Correct	448 (37.1)	53 (28.2)	36 (45.6)	
There are certain days during the menstrual cycle when a woman is more likely to become pregnant.				.616
Incorrect	273 (22.6)	37 (19.7)	16 (20.3)	
Correct	935 (77.4)	151 (80.3)	63 (79.7)	
Fertile days occur about halfway between two periods.				.448
Incorrect	985 (81.5)	159 (84.6)	62 (78.5)	
Correct	223 (18.5)	29 (15.4)	17 (21.5)	
First menstruation is the best sign a girl is now able to become pregnant.				.035*
Incorrect	230 (19.0)	32 (17.0)	6 (7.6)	
Correct	978 (81.0)	156 (83.0)	73 (92.4)	
Ejaculation is the best sign that a boy is able to get a girl pregnant.				.002**
Incorrect	467 (38.7)	58 (30.9)	17 (21.5)	
Correct	741 (61.3)	130 (69.1)	62 (78.5)	
A man can possibly get a woman pregnant anytime.				.838
Incorrect	791 (65.5)	119 (63.3)	51 (64.6)	
Correct	417 (34.5)	69 (36.7)	28 (35.4)	
A breastfeeding woman can get pregnant before her period returns.				.160
Incorrect	445 (36.8)	61 (32.4)	22 (27.8)	
Correct	763 (63.2)	127 (67.6)	57 (72.2)	
Women should wait 2 years after birth before getting pregnant again				n/a
Incorrect	61 (5.0)	14 (7.4)	1 (1.3)	
Correct	1147 (95.0)	174 (92.6)	78 (98.7)	
Knows all criteria for using LAM.				n/a
Incorrect	1206 (99.8)	185 (98.4)	79 (100.0)	
Correct	2 (0.2)	3 (1.6)	0 (0.0)	

* p<.05, ** p <.01

Table 3: Binary logistic regression results for selected fertility awareness indicators

	First menstruation sign of fertility	Ejaculation sign of fertility	First day of menstrual cycle	There are fertile days during the menstrual cycle	Pregnancy while breastfeeding is possible
Listenership					
Non-Listener	<reference>	<reference>	<reference>	<reference>	<reference>
Standard listener	1.7 (1.1 – 2.6)*	1.3 (0.9 – 1.8)	0.8 (0.6 – 1.2)	1.6 (1.0 – 2.4)*	1.1 (0.8 – 1.5)
Engaged listener	3.2 (1.3 – 7.7)*	2.5 (1.4 – 4.5)**	1.7 (1.0 – 2.7)*	1.2 (0.6 – 2.2)	1.7 (1.0 – 2.9)*
Sex					
Male	<reference>	<reference>	<reference>	<reference>	<reference>
Female	4.5 (3.3 – 6.3)***	0.9 (0.7 – 1.1)	2.1 (1.7 – 2.7)***	3.4 (2.5 – 4.5)***	0.8 (0.6 – 1.0)*
Age					
15 – 24	<reference>	<reference>	<reference>	<reference>	<reference>
25 – 34	1.1 (0.7 – 1.8)	1.6 (1.1 – 2.3)*	1.3 (0.9 – 1.9)	1.7 (1.1 – 2.6)*	1.5 (1.1 – 2.2)*
35 +	2.2 (1.3 – 3.9)**	2.2 (1.4 – 3.3)***	1.5 (1.0 – 2.3)*	2.3 (1.4 – 3.7)**	1.8 (1.2 – 2.6)**
Marital status					
Single	<reference>	<reference>	<reference>	<reference>	<reference>
Married	1.6 (0.9 – 2.9)	0.9 (0.6 – 1.4)	1.2 (0.8 – 1.9)	2.2 (1.3 – 3.7)**	1.7 (1.1 – 2.6)*
Education					
None	<reference>	<reference>	<reference>	<reference>	<reference>
Primary	1.5 (1.0 – 2.4)	1.1 (0.8 – 1.6)	0.8 (0.5 – 1.1)	1.6 (1.1 – 2.5)*	1.5 (1.1 – 2.2)*
Secondary	2.7 (1.6 – 4.7)***	3.1 (2.0 – 4.8)***	1.7 (1.1 – 2.5)*	4.1 (2.4 – 6.8)***	2.2 (1.4 – 3.4)***
Higher education	2.1 (0.9 – 4.8)	2.4 (1.1 – 4.9)*	2.8 (1.5 – 5.4)**	4.8 (1.9 – 12.5)**	2.3 (1.1 – 4.6)*
Children					
No children	<reference>	<reference>	<reference>	<reference>	<reference>
Children	0.9 (0.5 – 1.5)	1.2 (0.7 – 1.8)	1.5 (1.0 – 2.4)	0.6 (0.4 – 1.1)	1.1 (0.7 – 1.7)
Wealth	n/a		n/a		n/a
Lowest		<reference>		<reference>	
Second		1.1 (0.8 – 1.5)		1.5 (1.0 – 2.3)*	
Middle		1.4 (1.0 – 2.1)		1.8 (1.1 – 2.7)**	
Fourth		1.3 (0.9 – 1.9)		1.2 (0.8 – 1.8)	
Highest		1.5 (0.9 – 2.5)		1.5 (1.0 – 2.5)	
Residence	n/a		n/a	n/a	n/a
Rural		<reference>			
Urban		1.0 (0.7 – 1.5)			
Province	n/a		n/a	n/a	
West		<reference>			<reference>
East		1.6 (1.0 – 2.7)			1.9 (1.1 – 3.0)*
Kigali		1.7 (0.9 – 2.9)			1.8 (1.1 – 2.9)*
North		1.8 (1.1 – 2.9)*			1.6 (1.0 – 2.6)
South		2.5 (1.5 – 4.1)***			2.3 (1.4 – 3.7)**
Religion		n/a	n/a		n/a
Catholic	1.5 (0.6 - 3.4)			2.0 (0.9 - 4.5)	
Protestant	2.7 (1.1 - 6.6)*			1.8 (0.8 - 4.3)	
Christian	1.2 (0.5 - 2.7)			1.8 (0.8 - 4.0)	
Muslim	1.2 (0.4 - 3.2)			2.4 (0.9 - 6.5)	
Other	<reference>			<reference>	

* p<.05, ** p <.01, *** p <.001

Table 4: Family planning views (attitudinal, knowledge, self-efficacy, and social norms) of Impano n'Impamba listeners and non-listeners

	Non-listeners N=1208 n (%)	Listeners N=267 n (%)	Chi-square p-value
It is possible to control family size.			.059
Yes	1086 (89.9)	250 (93.6)	
No/Don't know	122 (10.1)	17 (6.4)	
A couple has the right to determine the number of children they will have.			.023*
Yes	1134 (93.9)	260 (97.4)	
No/Don't know	74 (6.1)	7 (2.6)	
Approves of couples using contraception.			.244
Approve	1181 (97.8)	264 (98.9)	
Disapprove/Don't know	27 (2.2)	3 (1.1)	
People who are important to me approve of me using family planning. (Among current family planning users)			.018*
Yes	329 (64.6)	89 (76.1)	
No/Don't know	180 (35.4)	28 (23.9)	
In my community, many married couples use family planning.			.108
Yes	898 (74.3)	211 (79.0)	
No/Don't know	310 (25.7)	56 (21.0)	
In my community, many unmarried men use family planning.			.001**
Yes	533 (44.1)	147 (55.1)	
No/Don't know	675 (55.9)	120 (44.9)	
In my community, many unmarried women use family planning.			.005**
Yes	498 (41.2)	135 (50.6)	
No/Don't know	710 (58.8)	132 (49.4)	
I know where to go to obtain family planning services.			.069
Yes	1127 (93.3)	257 (96.3)	
No	81 (6.7)	10 (3.7)	
I am confident that I can access a family planning method if I want to plan or prevent a pregnancy.			n/a
Strongly agree	596 (49.3)	129 (48.3)	
Agree	537 (44.5)	126 (47.2)	
Neutral	32 (2.6)	8 (3.0)	
Disagree	35 (2.9)	4 (1.5)	
Strongly disagree	8 (0.7)	0 (0.0)	

* p<.05, ** p <.01

Table 5: Binary logistic regression results for selected family planning views

	Many married couples use family planning	Many unmarried men use family planning	Many unmarried women use family planning	I know where to go to obtain family planning
Listenership				
Non-Listener	<reference>	<reference>	<reference>	<reference>
Listener	1.4 (1.0 - 2.0)*	1.3 (1.0 - 1.8)*	1.4 (1.0 - 1.8)*	2.2 (1.1 - 4.4)*
Sex				
Male	<reference>	2.1 (1.7 - 2.6)***	1.4 (1.2 - 1.8)**	<reference>
Female	1.7 (1.3 - 2.2)***	<reference>	<reference>	1.8 (1.1 - 2.8)*
Age				
15 – 24	<reference>	<reference>	<reference>	<reference>
25 – 34	1.2 (0.8 - 1.8)	1.1 (0.8 - 1.6)	1.2 (0.8 - 1.7)	2.6 (1.1 - 6.0)*
35 +	1.5 (0.9 - 2.5)	1.2 (0.8 - 1.8)	1.2 (0.8 - 1.7)	1.4 (0.5 - 3.6)
Marital status				
Single	1.5 (0.9 - 2.6)	1.6 (1.1 - 2.5)*	1.9 (1.2 - 2.8)**	<reference>
Married	<reference>	<reference>	<reference>	3.0 (1.1 - 8.1)*
Education				
None	1.7 (0.8 - 3.6)	1.5 (0.8 - 3.0)	<reference>	<reference>
Primary	1.5 (0.8 - 2.7)	1.5 (0.8 - 2.7)	1.4 (1.0 - 2.0)	1.9 (0.9 - 4.0)
Secondary	1.1 (0.6 - 2.0)	1.5 (0.8 - 2.6)	1.1 (0.7 - 1.7)	5.3 (2.3 - 11.9)***
Higher education	<reference>	<reference>	0.9 (0.5 - 1.6)	---
Children				
No children	<reference>	<reference>	<reference>	<reference>
Children	2.2 (1.3 - 3.7)**	1.0 (0.6 - 1.6)	1.3 (0.8 - 2.1)	2.6 (0.9 - 7.6)
Wealth		n/a	n/a	n/a
Lowest	1.6 (0.9 - 2.8)			
Second	1.6 (1.0 - 2.7)			
Middle	1.9 (1.1 - 3.2)*			
Fourth	1.3 (0.8 - 2.0)			
Highest	<reference>			
Residence		n/a	n/a	n/a
Rural	1.1 (0.7 - 1.6)			
Urban	<reference>			
Province			n/a	n/a
West	<reference>	<reference>		
East	2.2 (1.3 - 3.8)**	1.4 (0.9 - 2.3)		
Kigali	1.3 (0.7 - 2.4)	1.4 (0.9 - 2.3)		
North	2.8 (1.6 - 4.8)***	1.4 (0.9 - 2.4)		
South	1.8 (1.1 - 3.1)*	2.0 (1.2 - 3.2)**		
Religion	n/a			
Catholic		1.4 (1.0 - 1.9)*	1.3 (1.1 - 1.7)*	2.7 (0.9 - 8.4)
Protestant		<reference>	1.1 (0.8 - 1.5)	3.5 (1.0 - 12.4)
Christian		1.2 (0.8 - 1.6)	<reference>	2.6 (0.8 - 8.3)
Muslim		1.4 (0.8 - 2.4)	1.5 (0.9 - 2.5)	10.8 (1.1 - 105.2)*
Other		2.4 (1.0 - 5.5)*	1.6 (0.7 - 3.3)	<reference>

* p<.05, ** p <.01, *** p <.001

Table 6: Knowledge of family planning methods, of Impano n'Impamba listeners and non-listeners

	Non-listeners N=1208 n (%)	Listeners N=267 n (%)	Total N=1475 n (%)	Chi-square p-value
Can spontaneously name at least one method of family planning				.006**
Yes	1122 (92.9)	260 (97.4)	1382 (93.7)	
No	86 (7.1)	7 (2.6)	93 (6.3)	
Can recognize at least one method of family planning				.247[1]
Yes	1200 (99.3)	263 (98.5)	1463 (99.2)	
No	8 (0.7)	4 (1.5)	12 (0.8)	
Knowledge of specific family planning methods:				
Female sterilization	930 (77.0)	210 (78.7)	1140 (77.3)	.557
Male sterilization	918 (76.0)	221 (82.8)	1139 (77.2)	.017*
Pill	1136 (94.0)	260 (97.4)	1396 (94.6)	.028*
IUD	993 (82.2)	224 (83.9)	1217 (82.5)	.510
Injection	1154 (95.5)	262 (98.1)	1416 (96.0)	.050
Implant	1119 (92.6)	257 (96.3)	1376 (93.3)	.032*
Male condom	1182 (97.8)	267 (100)	1449 (98.2)	.016*
Female condom	975 (80.7)	228 (85.4)	1203 (81.6)	.074
Diaphragm	117 (9.7)	37 (13.9)	154 (10.4)	.044*
Foam or jelly	141 (11.7)	43 (16.1)	184 (12.5)	.047*
LAM	588 (48.7)	157 (58.8)	745 (50.5)	.003**
SDM/CycleBeads	968 (80.1)	241 (90.3)	1209 (82.0)	.000***
Rhythm/periodic abstinence	1082 (89.6)	253 (94.8)	1335 (90.5)	.009**
Withdrawal	808 (66.9)	191 (71.5)	999 (67.7)	.142
Emergency contraception	331 (27.4)	99 (37.1)	430 (29.2)	.002**

* p<.05, ** p <.01, *** p <.001

[1] Fisher's exact test used instead of Pearson chi-square because 1 or more cells had an expected count less than 5.

Table 7: Family planning use of Impano n'Impamba listeners and non-listeners

	Non-listeners N=1208 n (%)	Listeners N=267 n (%)	Chi-square p-value
Current use of any method of family planning			.614
Yes	509 (42.1)	117 (43.8)	
No	699 (57.9)	150 (56.2)	
Current use of a modern method of family planning			.461
Yes	771 (63.8)	164 (61.4)	
No	437 (36.2)	103 (38.6)	
Length of time using current method (Among current family planning users)			.820
3 months	82 (16.1)	17 (14.5)	
6 months	36 (7.1)	6 (5.1)	
9 months	22 (4.3)	6 (5.1)	
12 months or more	369 (72.5)	88 (75.2)	
Intends to use any method of family planning in the future (Among current non-users)			.014*
Yes	390 (55.8)	100 (66.7)	
No	309 (44.2)	50 (33.3)	
Intends to use a modern method of family planning in the future (Among current non-users)			.009**
Yes	347 (49.6)	92 (61.3)	
No	352 (50.4)	58 (38.7)	

* p<.05, ** p <.01

Table 8: Binary logistic regression results for current family planning use

There are fertile days during the menstrual cycle		n/a
Correct	1.4 (1.0 - 1.9)*	
Incorrect	<reference>	
The baby must be exclusively breastfed to use LAM	n/a	
Correct		1.4 (1.1 - 1.9)*
Incorrect		<reference>
Sex		
Male	2.2 (1.7 - 2.8)***	2.1 (1.6 - 2.7)***
Female	<reference>	<reference>
Age		
15 – 24	<reference>	<reference>
25 – 34	1.7 (1.2 - 2.5)**	1.7 (1.2 - 2.5)**
35 +	0.7 (0.5 - 1.1)	0.7 (0.5 - 1.1)
Marital status		
Single	<reference>	<reference>
Married	1.4 (0.9 - 2.2)	1.4 (0.9 - 2.3)
Education		
None	<reference>	<reference>
Primary	0.9 (0.6 - 1.4)	1.0 (0.7 - 1.4)
Secondary	1.0 (0.6 - 1.5)	1.0 (0.6 - 1.6)
Higher education	2.0 (1.0 - 4.1)	2.0 (1.0 - 4.2)
Children		
No children	<reference>	<reference>
Children	9.1 (5.5 - 15.0)***	8.6 (5.2 - 14.1)***
Religion		
Catholic	<reference>	<reference>
Protestant	0.8 (0.6 - 1.2)	0.8 (0.6 - 1.2)
Christian	0.9 (0.7 - 1.2)	0.9 (0.7 - 1.2)
Muslim	1.3 (0.8 - 2.4)	1.4 (0.8 - 2.4)
Other	2.3 (0.9 - 5.6)	2.1 (0.9 - 5.2)

* p<.05, ** p <.01, *** p <.001

Table 9: Communication about family planning and fertility awareness of Impano n'Impamba listeners and non-listeners

	Non-listeners N=1208 n (%)	Listeners N=267 n (%)	Chi-square p-value
Discussed family planning with partner in the past 3 months (Among married participants)			.293
Yes	405 (63.9)	98 (68.5)	
No	229 (36.1)	45 (31.5)	
Discussed family planning with family, friends, or neighbors in the past 3 months			.031*
Yes	332 (27.5)	91 (34.1)	
No	876 (72.5)	176 (65.9)	
Discussed fertile days during the menstrual cycle with anyone in the past 3 months			.300
Yes	285 (23.6)	71 (26.6)	
No	923 (76.4)	196 (73.4)	
People who are important to me seek information and advice on how to plan or prevent a pregnancy when they need it.			.987
Strongly agree	371 (30.7)	86 (32.2)	
Agree	636 (52.6)	136 (50.9)	
Neutral	87 (7.2)	19 (7.1)	
Disagree	81 (6.7)	18 (6.7)	
Strongly disagree	33 (2.7)	8 (3.0)	
People who are important to me seek information and advice about issues related to menstruation when they need it.			.316
Strongly agree	405 (33.5)	100 (37.5)	
Agree	657 (54.4)	145 (54.3)	
Neutral	63 (5.2)	7 (2.6)	
Disagree	51 (4.2)	10 (3.7)	
Strongly disagree	32 (2.6)	5 (1.9)	
I feel comfortable talking about issues related to menstruation.			.690
Strongly agree	414 (34.3)	87 (32.6)	
Agree	620 (51.3)	137 (51.3)	
Neutral	41 (3.4)	14 (5.2)	
Disagree	98 (8.1)	22 (8.2)	
Strongly disagree	35 (2.9)	7 (2.6)	

* p<.05

Table 10: Binary logistic regression results for communication about family planning (someone other than spouse)

Listenership	
Non-Listener	<reference>
Listener	1.6 (1.2 - 2.1)**
Sex	
Male	<reference>
Female	1.4 (1.1 - 1.8)*
Age	
15 – 24	<reference>
25 – 34	1.7 (1.2 - 2.6)**
35 +	1.6 (1.0 - 2.4)
Marital status	
Single	<reference>
Married	1.5 (0.9 - 2.5)
Education	
None	<reference>
Primary	1.7 (1.1 - 2.5)*
Secondary	2.3 (1.4 - 3.6)**
Higher education	2.2 (1.1 - 4.4)*
Children	
No children	<reference>
Children	2.0 (1.2 - 3.2)**
Religion	
Catholic	2.1 (0.7 - 6.2)
Protestant	2.4 (0.8 - 7.4)
Christian	2.2 (0.7 - 6.5)
Muslim	4.3 (1.3 - 14.0)*
Other	<reference>

* p<.05, ** p <.01

Appendix 3: References

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